AIR QUALITY REPORT

SR-60/World Logistics Center Parkway Interchange

City of Moreno Valley, Riverside County, California

08-RIV-60 PM 20.0/22.0
EA No. 0M590
Project No. 0813000109

Prepared by

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, CA 92614

Caltrans

January 2020

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AIR QUALITY REPORT

RIVERSIDE COUNTY, CALIFORNIA

CALIFORNIA DEPARTMENT OF TRANSPORTATION DISTRICT 8

EA No. 0M590

Project No. 0813000109

Reviewed by: Olufemi Odufalu Date: 01/29/2020

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Acronyms and Abbreviations

Term	Definition
µg/m^3	micrograms per cubic meter
ºF	Degrees Fahrenheit
AADT	Average annual daily traffic
AB	Assembly bill
ac	acre(s)
ADT	Average daily traffic
AQMP	Air Quality Management Plan
ATM	Active Traffic Management
BACM	Best available control measures
Basin	South Coast Air Basin
BMP	Best Management Practice
CAAQS	California Ambient Air Quality Standards
Cal/EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAP	Climate Action Program
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane
City	Moreno Valley
CO	Carbon monoxide
CO_2	Carbon dioxide
County	Riverside
CO-CAT	Coastal Ocean Climate Action Team

Term	Definition
EO	Executive Order
FCAA	Federal Clean Air Act
FHWA	Federal Highway Administration
ft	Feet
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	Greenhouse gas
IPCC	International Panel on Climate Change
ITS	Intelligent Transportation Systems
LOS	Level of service
LRTP	Long Range Transportation Plan
mi	Miles
MOVES	Motor Vehicle Emission Simulator
mph	Miles per hour
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MSAT	Mobile Source Air Toxics
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
NO_2	Nitrogen dioxide
NOA	Naturally occurring asbestos
NO_x	Nitrogen oxide
O&M	Operations and maintenance
O_3	Ozone
OMB	White House Office of Management & Budget
OPR	Office of Planning and Research

Term	Definition
PM	Particulate matter
PM_{10}	Particulate matter less than 10 microns in diameter
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
POAQC	project of air quality concern
ppm	Parts per million
Protocol	Transportation Project-Level Carbon Monoxide Protocol
ROGs	Reactive organic gases
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
SB	Senate Bill
SCS	Sustainable Communities Strategy
SIP	State Implementation Plan
SO_2	Sulfur dioxide
TACs	Toxic air contaminants
TDM	Transportation Demand Management
TSM	Transportation System Management
TIP	Transportation Improvement Program
USC	United States Code
USDOT	United States Department of Transportation
U.S. EPA	United States Environmental Protection Agency
UV	Ultraviolet
VHT	Vehicle hours traveled
VMT	Vehicle miles traveled
VOCs	Volatile organic compounds
WLC	World Logistics Center

1. Project Description

1.1 Introduction

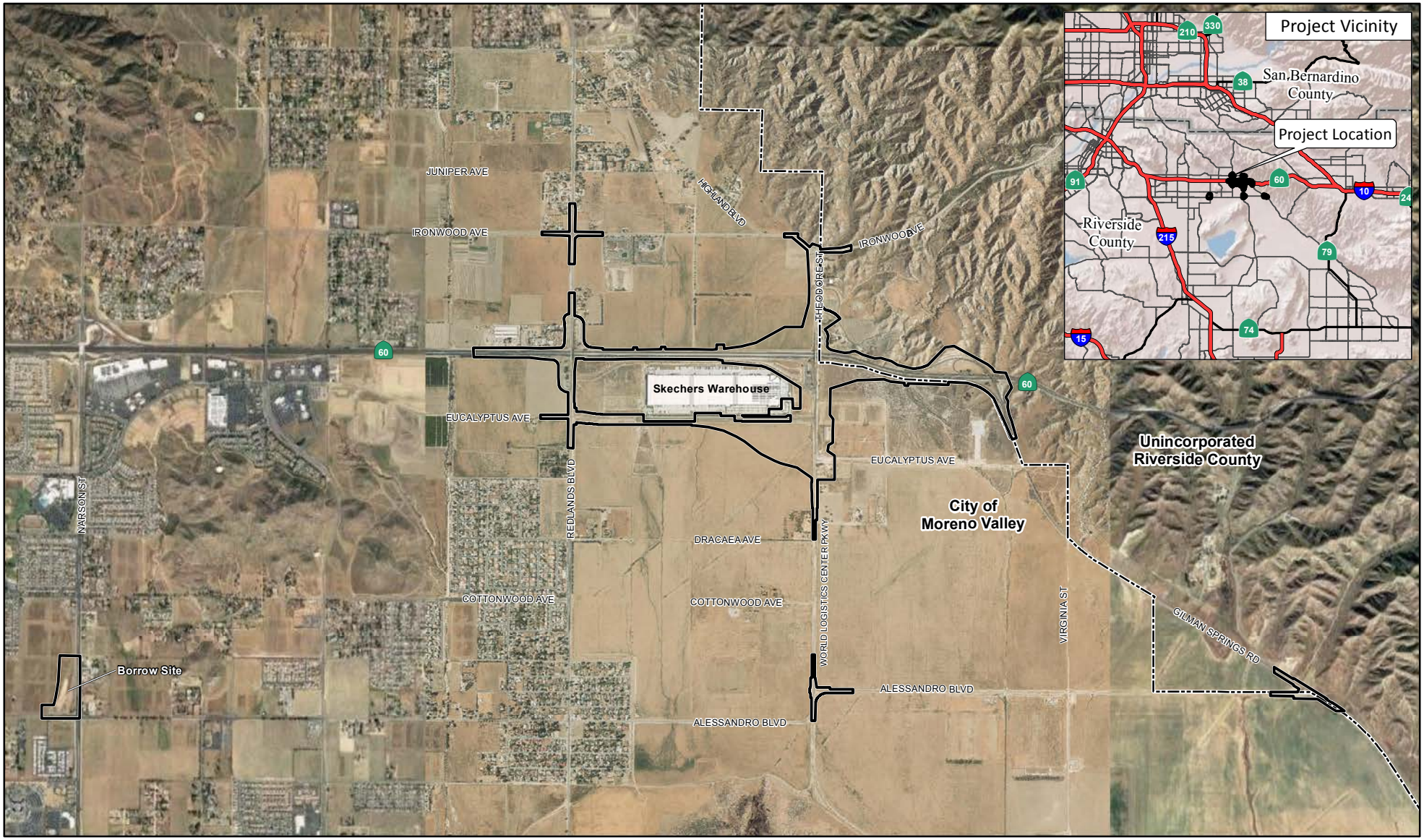
The City of Moreno Valley (City), in cooperation with the California Department of Transportation (Caltrans) District 8, proposes to reconstruct and improve the State Route 60 (SR-60)/Theodore Street interchange. A segment of Theodore Street has been renamed to World Logistics Center Parkway (WLC Pkwy). The SR-60/Theodore Street Interchange Project will now be referred to as the SR-60/World Logistics Center Parkway Interchange Project (Project). Figure 1-1 shows the regional and project location. The purpose of the project is to alleviate existing and future traffic congestion at the SR-60/WLC Pkwy interchange ramps during peak hours, to improve traffic flow along the freeway and through the interchange, to improve safety by upgrading the geometry at the current interchange, and to provide standard vertical clearance for the WLC Pkwy overcrossing.

The project will be funded with a variety of funding sources including federal and local funds and, as such, will be required to comply with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans will be the Lead Agency for CEQA, the City is a Responsible Agency under CEQA, and the Federal Highway Administration (FHWA) is the federal Lead Agency for NEPA. The environmental review, consultation, and any other action required in accordance with the applicable federal laws for this project will be carried out by Caltrans under its assumption of responsibility pursuant to 23 United States Code (USC) 327. Therefore, preparation of the NEPA compliance documents, including the technical studies and the environmental document, will have oversight by Caltrans District 8. An Environmental Impact Report/Environmental Assessment (EIR/EA) (joint CEQA/NEPA document) is being prepared and is anticipated to result in an EIR/Finding of No Significant Impact (EIR/FONSI).

1.2 Location and Background

The majority of the project site is located in the City of Moreno Valley; however, the northeast quadrant of the site is located within unincorporated Riverside County (County) but within the City's Sphere of Influence.

This project is included in the 2019 Federal Transportation Improvement Program (FTIP) and is proposed for funding from local and federal funds. It is also included in the SCAG's 2016 Regional Transportation Plan/ Sustainable Communities Strategy (RTP/SCS).



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Project Area

City Boundary

FIGURE 1-1

SR-60/World Logistics Center Parkway Interchange Project

Project Location and Vicinity

08-RIV-60 PM 20.0/22.0
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FEET

SOURCE: Google (2014, 2016); MBI (6/2018); ESRI (07/2012)

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1.3 Purpose and Need

1.3.1 Purpose

The purpose of the proposed project is to:

1. Provide increased interchange capacity, reduce congestion, and improve traffic operations to support the forecast travel demand for the 2045 design year;
2. Improve existing and projected interchange geometric deficiencies; and
3. Accommodate a multimodal facility that has harmony with the community and preserves the values of the area.

1.3.2 Need

The proposed project is needed for the following reasons:

1. According to the demographics and growth forecast prepared for the 2016 Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), between 2012 and 2040, Riverside County's population is expected to increase by 41 percent, job growth is anticipated to increase by 90 percent, and households are anticipated to increase by 51 percent. For Moreno Valley specifically, between 2012-2040, population is anticipated to increase by 30 percent, household jobs are anticipated to increase by 165 percent, and households are anticipated to increase by 41 percent. Without improvements, in the year 2045, the eastbound and westbound on-and off-ramps are anticipated to operate at unacceptable levels of service (LOS) (LOS E in the a.m. peak hour and F in the p.m. peak hour, respectively) and the ramp intersections with WLC Pkwy are anticipated to operate at LOS F for both the AM and PM peak hours. The westbound mainline segment on SR-60 between WLC Pkwy and Redlands Boulevard is anticipated to operate at LOS E during the AM peak hour. The WLC Pkwy intersections with Ironwood Avenue, the SR-60 westbound and eastbound ramps, and Eucalyptus Avenue are forecast to operate at LOS F in the p.m. peak hour.

2. The overpass bridge at the interchange was hit in January 2015 resulting in costly emergency repairs, so there is a need to bring vertical clearance up to current standards. In addition, the WLC Pkwy overcrossing is geometrically deficient and needs additional capacity to accommodate projected future travel volumes.

3. This project will fulfill the need to accommodate the movement of people using multiple modes of transportation by community-based design taking into consideration the natural environment, social environment, transportation behavior, cultural characteristics and economic environment.

1.4 Baseline and Forecasted Conditions for No-Build and Project Alternatives

Three alternatives and two design variations will be evaluated in the environmental document for the proposed project: Alternative 1 (No Build Alternative [no project]), Alternative 2 (Modified Partial Cloverleaf), Alternative 6 (Modified Partial Cloverleaf with Roundabout Intersections), Alternative 2 with Design Variation 2a and Alternative 6 with Design Variation 6a. The Design Variations for each Build Alternative are similar and would realign the Eucalyptus Avenue to join WLC Pkwy approximately 900 feet south of the existing Eucalyptus Avenue/WLC Pkwy intersection. Both Build Alternatives and Design Variations would require full right of way acquisitions. Design Variation 6a would require the same amount of acquisitions with an additional full acquisition in the southeast quadrant of the interchange that would result in one residential displacement. There would be partial right-of-way acquisitions within all four quadrants of the interchange. See Figures 1-2 and 1-3, respectively, for the project geometrics.

1.4.1 Existing Roadways and Traffic Conditions

Although the City's General Plan Circulation Element designates WLC Pkwy as a Minor Arterial (two lanes in each direction), existing WLC Pkwy through the project limits is one travel lane in each direction, including on the overcrossing over SR-60. Existing SR-60 between Redlands Boulevard and Gilman Springs Road is two mixed-flow travel lanes in each direction. Traffic study data for the year 2018 is used for the baseline year. The study locations include the SR-60 mainline and the WLC Pkwy.

Table 1-1 summarizes the existing conditions; the details of the existing traffic information are documented in *SR-60/World Logistics Center Parkway Interchange* (WSP, 2018).

Table 1-1. Summary of Existing Traffic Conditions

Scenario/Analysis Year	Location	AADT		% Truck	LOS
		Total	Truck		
Existing/Baseline Year 2018	SR-60 at WLC Pkwy	68,423	8,192	12%	C
	WLC Pkwy	2,246	341	15%	F

Source: WSP Traffic Study, September 2018.

AADT = annual average daily traffic

mph = miles per hour

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- Alternative 2 Proposed Improvements
- Alternative 6 Proposed Improvements

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0 150 300
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SOURCE: Aerial - RBF (11/2014); ESRI (2013); MBI (2018)

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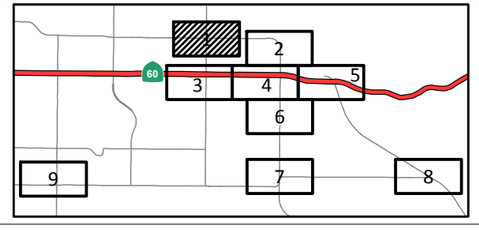

FIGURE 1-2
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SR-60/World Logistics Center Parkway Interchange Project
Alternatives 2 and 6
Geometrics
08-RIV-60 PM 20.0/22.0
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Alternative 2 Proposed Improvements

Alternative 6 Proposed Improvements

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SOURCE: Aerial - RBF (11/2014); ESRI (2013); MBI (2018)

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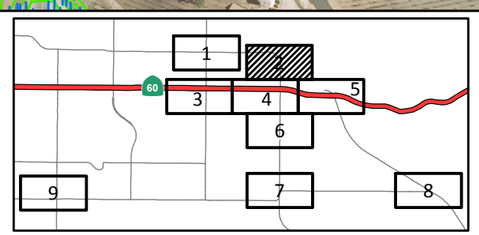

FIGURE 1-2

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SR-60/World Logistics Center Parkway Interchange Project

Alternatives 2 and 6

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Alternative 2 Proposed Improvements

Alternative 6 Proposed Improvements

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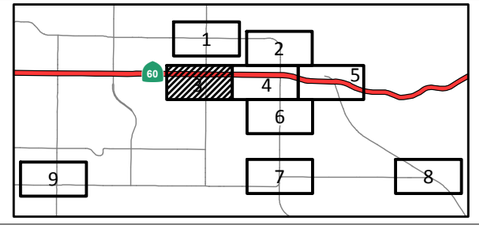

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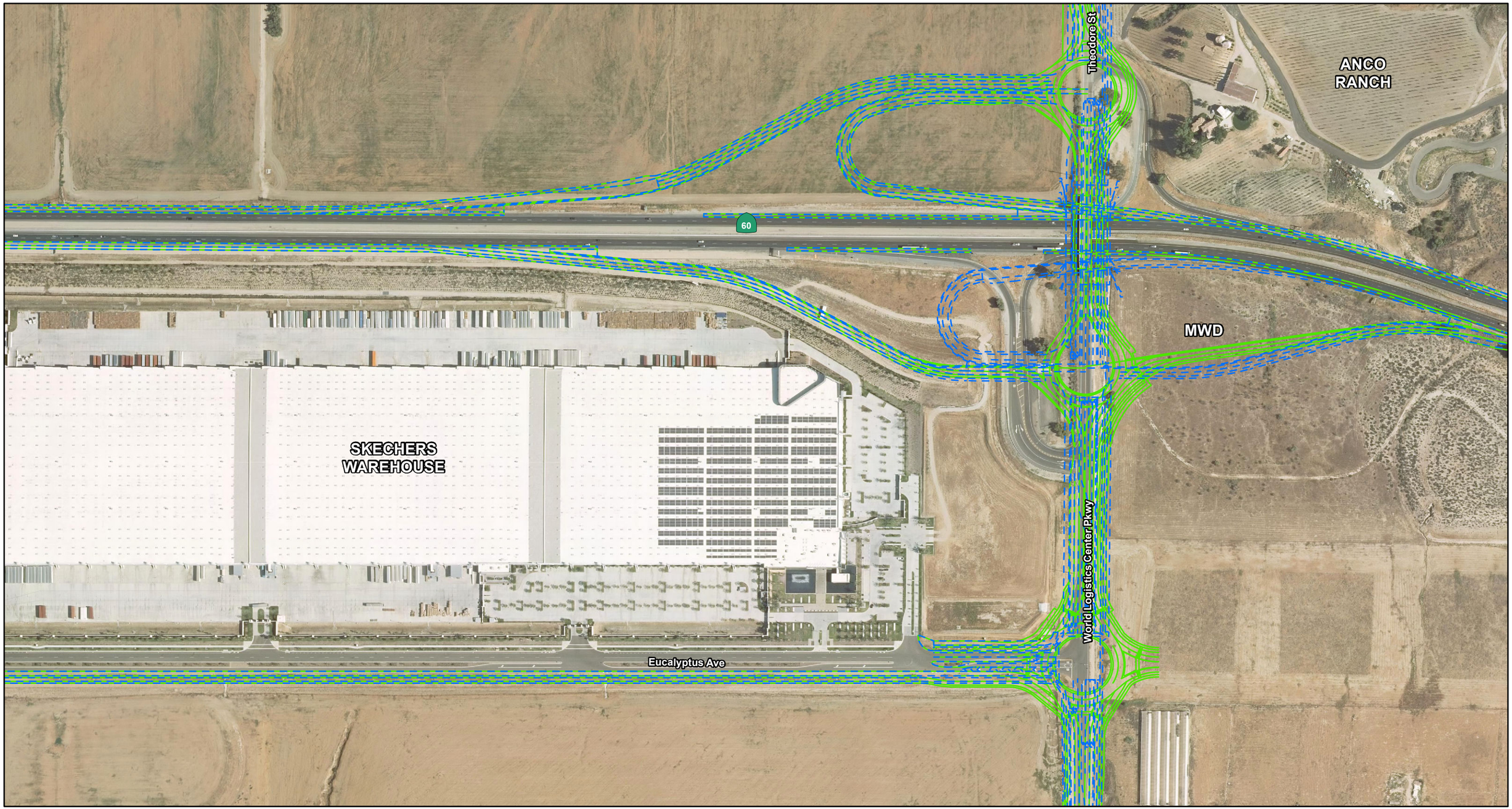

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- Alternative 2 Proposed Improvements
- Alternative 6 Proposed Improvements

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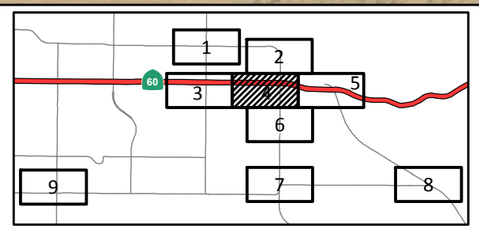

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Alternative 2 Proposed Improvements

Alternative 6 Proposed Improvements

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SOURCE: Aerial - RBF (11/2014); ESRI (2013); MBI (2018)

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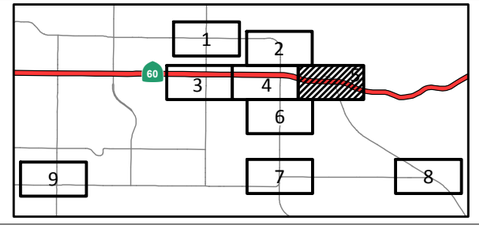

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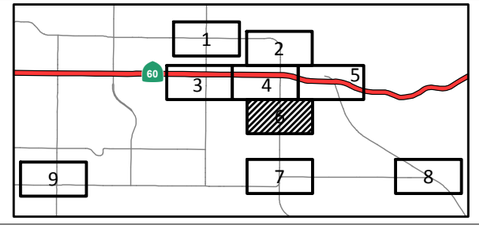

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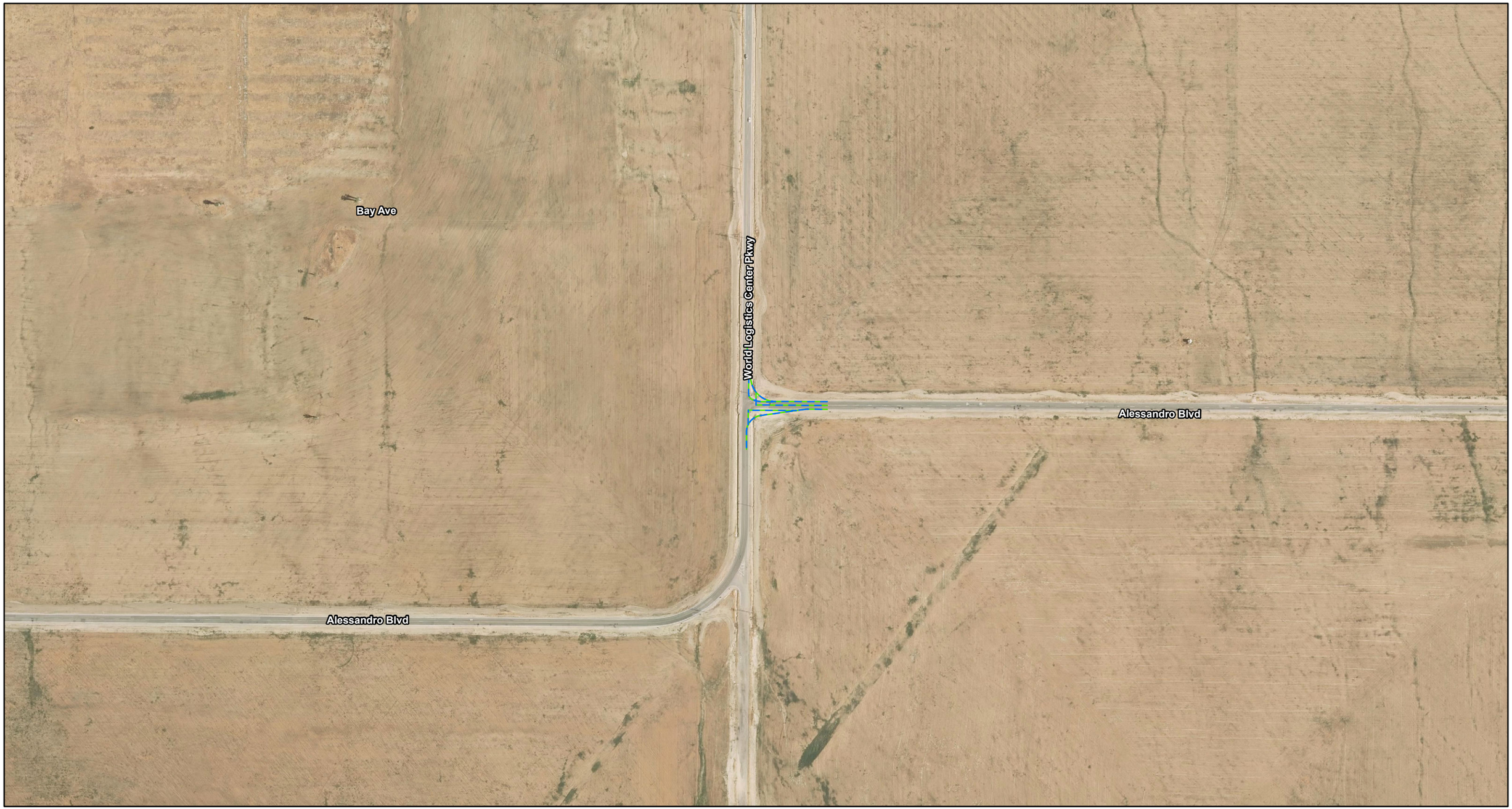

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Alternative 2 Proposed Improvements

Alternative 6 Proposed Improvements

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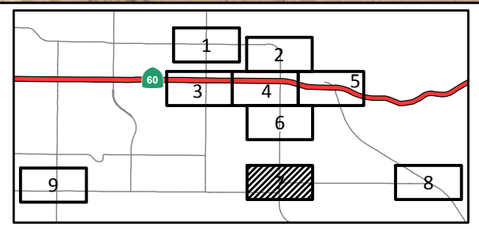

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Alternative 2 Proposed Improvements

Alternative 6 Proposed Improvements

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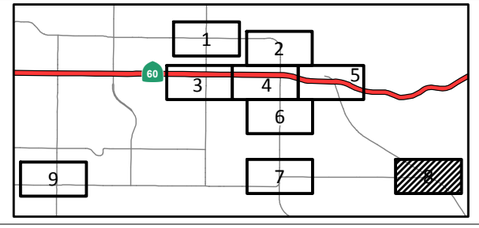

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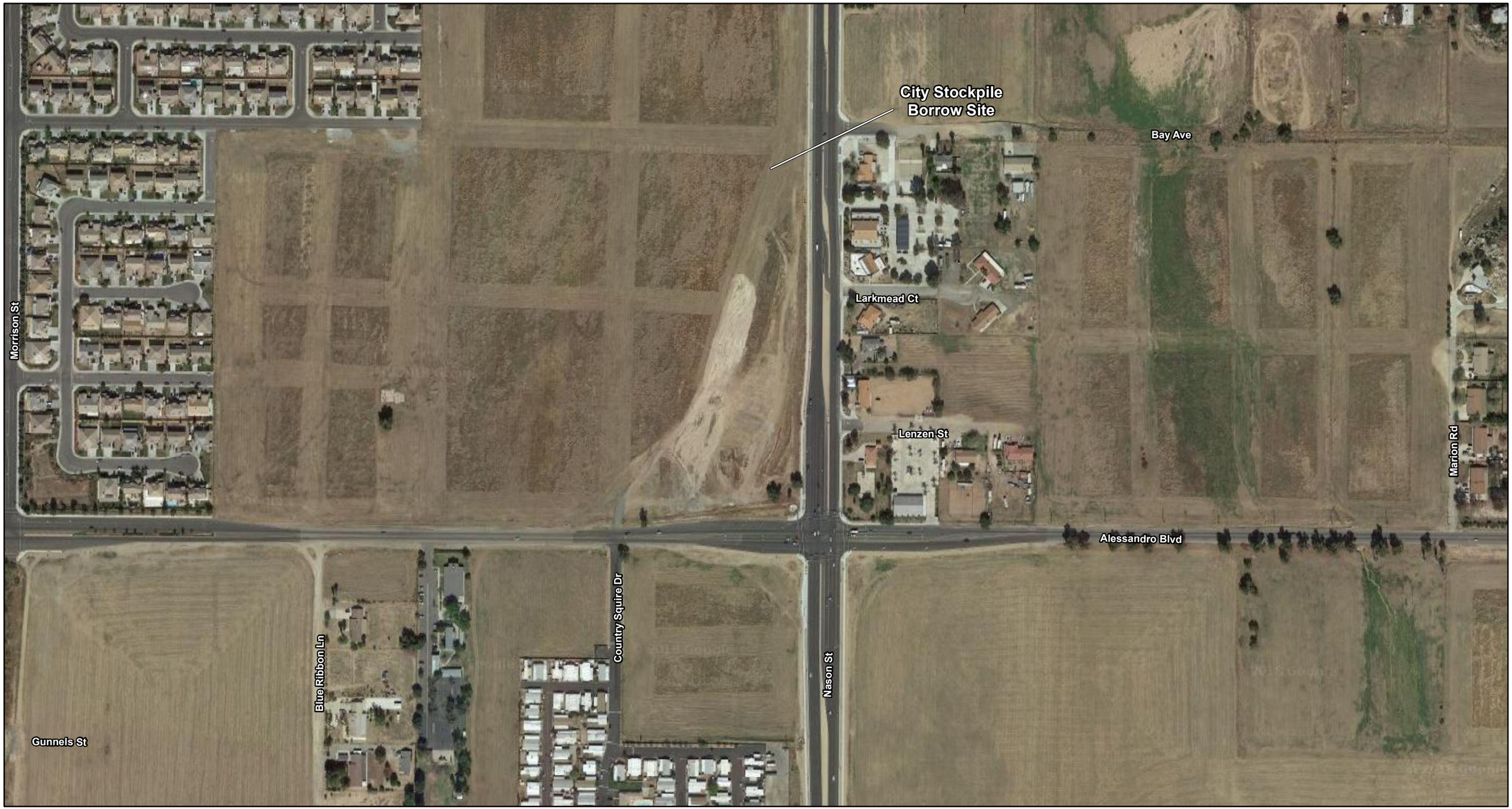

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Alternative 2 Proposed Improvements

Alternative 6 Proposed Improvements

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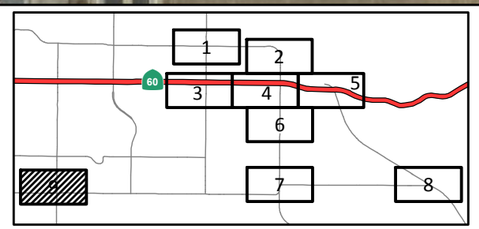

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- Design Variation 2a Proposed Improvements
- Design Variation 6a Proposed Improvements

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SOURCE: Aerial - RBF (11/2014); ESRI (2013); MBI (2018)

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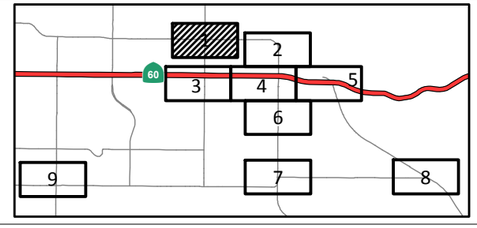

FIGURE 1-3
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SR-60/World Logistics Center Parkway Interchange Project

Design Variations 2a and 6a Geometrics

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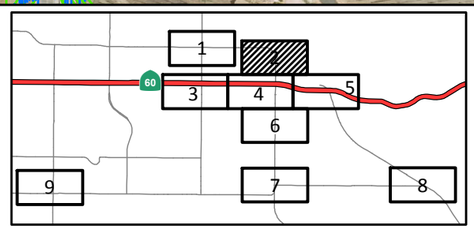
Design Variation 2a Proposed Improvements

Design Variation 6a Proposed Improvements



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Design Variations 2a and 6a Geometrics

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Design Variation 2a Proposed Improvements

Design Variation 6a Proposed Improvements

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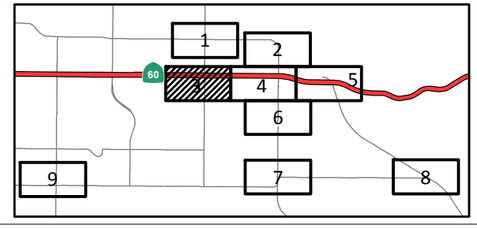

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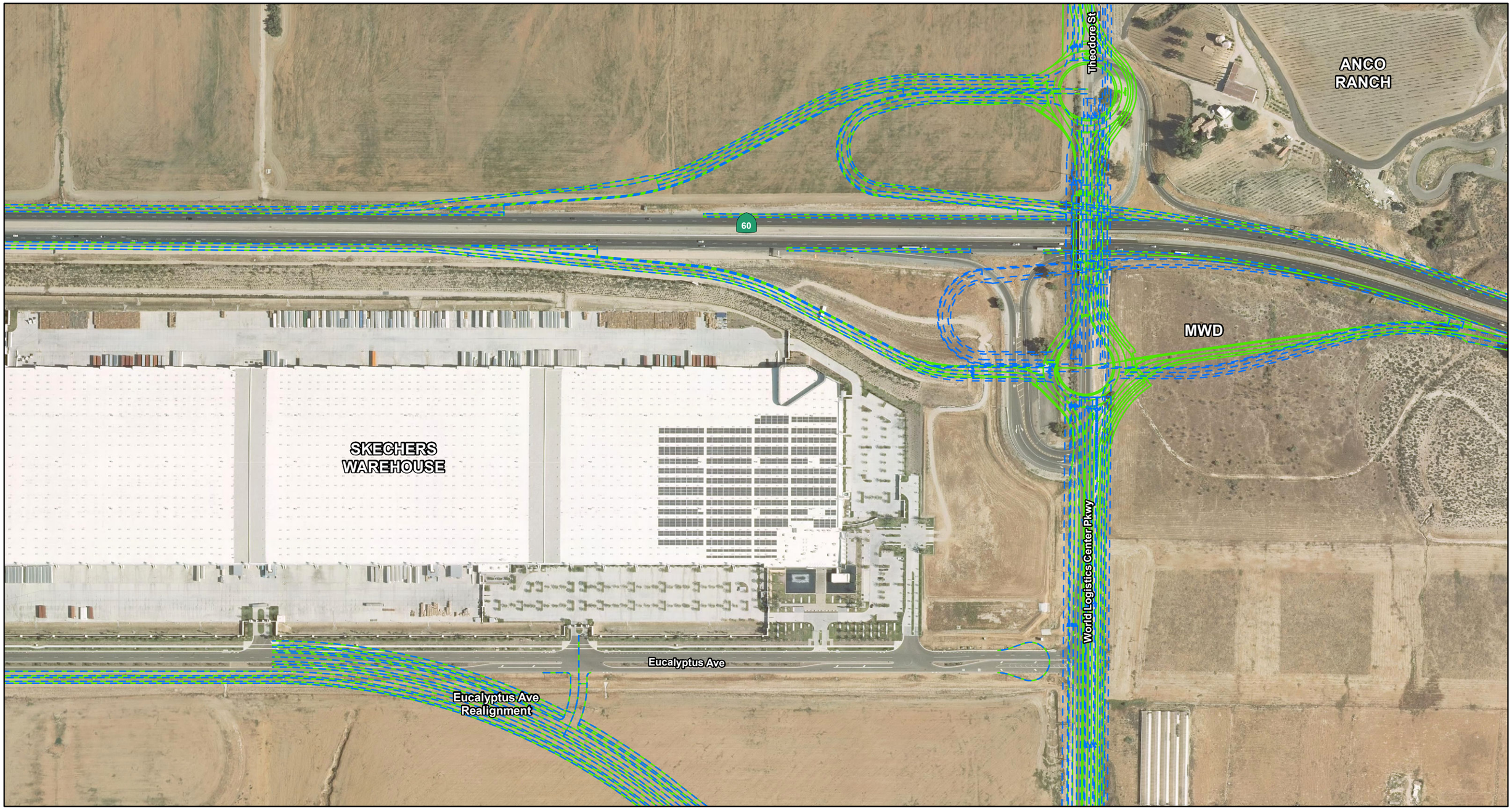

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Design Variation 2a Proposed Improvements

Design Variation 6a Proposed Improvements

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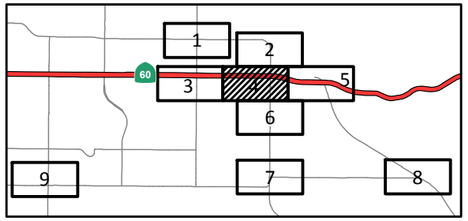

SOURCE: Aerial - RBF (11/2014); ESRI (2013); MBI (2018)

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Design Variation 2a Proposed Improvements

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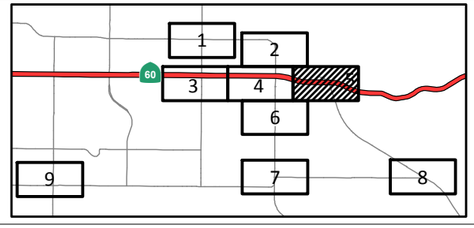

FIGURE 1-3
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SR-60/World Logistics Center Parkway Interchange Project

Design Variations 2a and 6a Geometrics

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Design Variation 2a Proposed Improvements

Design Variation 6a Proposed Improvements

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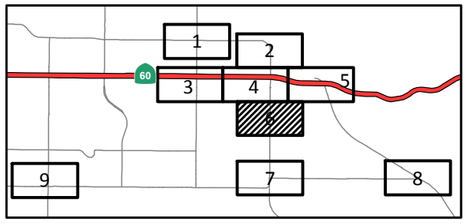

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FIGURE 1-3
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Design Variations 2a and 6a Geometrics

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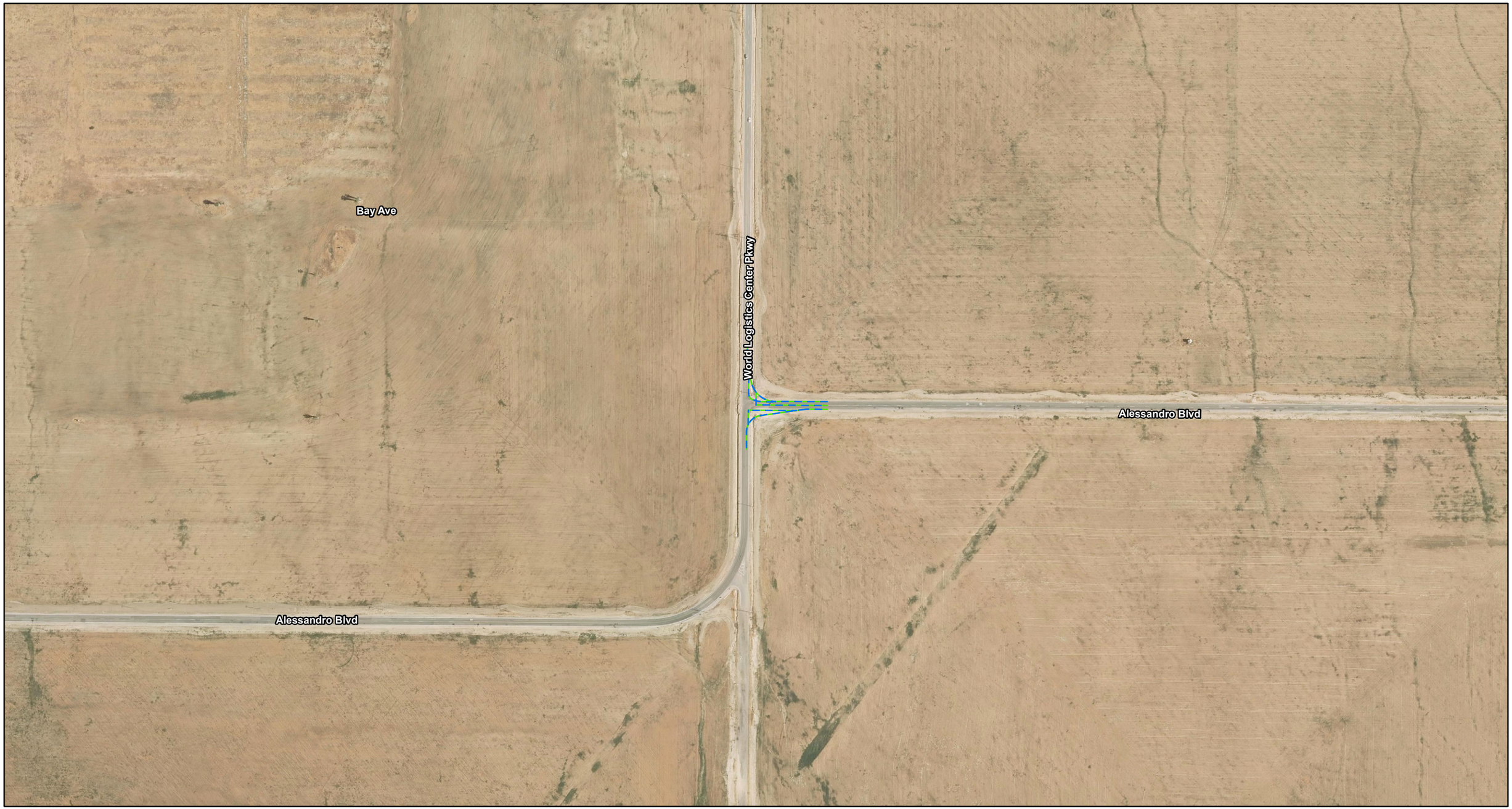

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Design Variation 2a Proposed Improvements

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SOURCE: Aerial - RBF (11/2014); ESRI (2013); MBI (2018)

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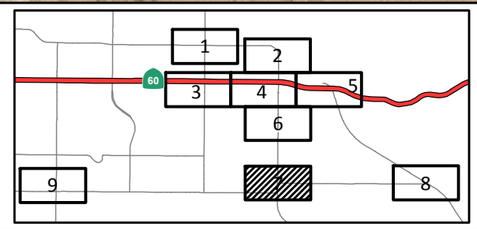

FIGURE 1-3
Sheet 7 of 9

SR-60/World Logistics Center Parkway Interchange Project

Design Variations 2a and 6a Geometrics

08-RIV-60 PM 20.0/22.0
EA No. 0M590
Project No. 0813000109

LEGEND

Design Variation 2a Proposed Improvements

Design Variation 6a Proposed Improvements

N

0 150 300
FEET

SOURCE: Aerial - RBF (11/2014); ESRI (2013); MBI (2018)

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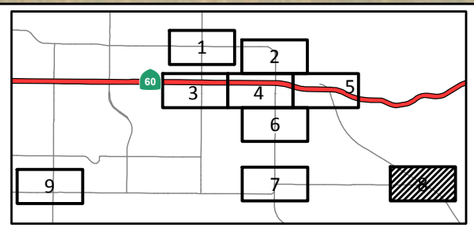


FIGURE 1-3
Sheet 8 of 9

SR-60/World Logistics Center Parkway Interchange Project

Design Variations 2a and 6a Geometrics

08-RIV-60 PM 20.0/22.0
EA No. 0M590
Project No. 0813000109

City Stockpile Borrow Site

Bay Ave

Morrison St

Larkmead Ct

Lenzen St

Marion Rd

Alessandro Blvd

Blue Ribbon Ln

Country Squire Dr

Nason St

Gunnels St

LEGEND

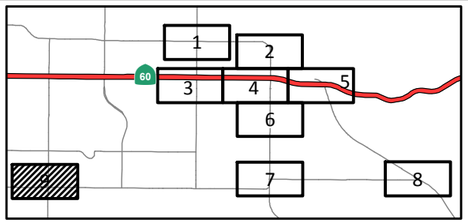
Design Variation 2a Proposed Improvements

Design Variation 6a Proposed Improvements

N

0 150 300

FEET



SOURCE: Aerial - RBF (11/2014); ESRI (2013); MBI (2018)

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FIGURE 1-3
Sheet 9 of 9

SR-60/World Logistics Center Parkway Interchange Project

Design Variations 2a and 6a Geometrics

08-RIV-60 PM 20.0/22.0
EA No. 0M590
Project No. 0813000109

1.4.2 No-Build Alternative

The No-Build (No Action) Alternative consists of those transportation projects that are already planned for construction by or before 2018. Consequently, the No-Build alternative represents future travel conditions in the SR-60/WLC Pkwy study area without the SR-60/WLC Pkwy project and is the baseline against which the other SR-60/WLC Pkwy alternatives will be assessed to meet National Environmental Policy Act (NEPA) requirements.

The No Build Alternative assumes that no improvements will be made to the freeway mainline or to the existing SR-60/WLC Pkwy interchange. Without the planned improvements proposed as part of the project, the LOS at the on- and off-ramps and traffic operations at the interchange would continue to worsen over time. Tables 1-2 and 1-3 list the summary of future No Build traffic conditions for the SR-60 mainline and affected arterial streets.

Table 1-2 Summary of Future No-Build Traffic Conditions.

Scenario/ Analysis Year	Location	AADT		% Truck
		Total	Truck	
No Build Year 2025	WLC Pkwy - Eucalyptus Avenue to SR-60 EB Ramps	24,242	8,744	36
	SR-60 - Redlands Boulevard to WLC Pkwy	92,116	15,490	17
	Ironwood Avenue - Redlands Boulevard to Theodore Street	2,587	638	25
	Eucalyptus Avenue - Redlands Boulevard to WLC Pkwy	1,668	861	52
No Build Year 2045	WLC Pkwy - Eucalyptus Avenue to SR-60 EB Ramps	31,816	12,512	39
	SR-60 - Redlands Boulevard to WLC Pkwy	168,384	23,699	14
	Ironwood Avenue - Redlands Boulevard to Theodore Street	6,941	840	12
	Eucalyptus Avenue - Redlands Boulevard to WLC Pkwy	5,370	1,308	24

Source: WSP, September 2018.

AADT = annual average daily traffic

WLC Pkwy = World Logistics Center Parkway
SR-60 = State Route 60
EB = eastbound
WB = westbound

Table 1-3 Summary of Future No-Build Intersection Conditions.

Scenario/ Analysis Year	Location	LOS	
		AM Peak Hour	PM Peak Hour
No Build Year 2025	World Logistics Center Pkwy/Eucalyptus	A	A
	World Logistics Center Pkwy/SR-60 EB Ramps	F	F
	World Logistics Center Pkwy/SR-60 WB Ramps	F	F
	Theodore Street/Ironwood Ave	A	A
No Build Year 2045	World Logistics Center Pkwy/Eucalyptus	D	D
	World Logistics Center Pkwy/SR-60 EB Ramps	F	F
	World Logistics Center Pkwy/SR-60 WB Ramps	F	F
	Theodore Street/Ironwood Ave	A	A

Source: WSP, September 2018.

LOS = level of service

WLC Pkwy = World Logistics Center Parkway
SR-60 = State Route 60
EB = eastbound
WB = westbound

1.4.3 Project Build Alternatives

Major improvements to the SR-60/WLC Pkwy interchange would include:

(1) reconstruction of the westbound and eastbound on- and off-ramps to SR-60,

(2) replacement of the existing WLC Pkwy overcrossing with an expanded four-lane overcrossing (two through lanes in each direction) with a minimum 16.5-foot vertical clearance between the eastbound and westbound SR-60 ramps and reconstruction of WLC Pkwy between the southern limits of the project and the eastbound SR-60 ramps, and

(3) construction of WLC Pkwy as follows:

- construct three lanes in each direction on WLC Pkwy between the eastbound SR-60 ramps and Eucalyptus Avenue west (Eucalyptus Avenue west of WLC Pkwy);
- construct two lanes in each direction but grade for three lanes in each direction on WLC Pkwy between Eucalyptus Avenue west and Eucalyptus Avenue east (Eucalyptus Avenue east of WLC Pkwy);
- narrow WLC Pkwy south of Eucalyptus Avenue to one lane in each direction.

The proposed improvements to the on- and off-ramps would extend west and east of the proposed overcrossing on SR-60 for proposed auxiliary lanes in each direction. The proposed improvements to Theodore Street/WLC Pkwy would extend north of SR-60 to Ironwood Avenue and south of SR 60 to south of Eucalyptus Avenue. Project construction is anticipated to begin in early 2022 and be completed in winter 2023, contingent upon full funding of all phases.

An existing Caltrans paved material transfer area located in the southwest quadrant of the existing SR-60/WLC Pkwy interchange, within the existing eastbound loop on-ramp, is currently used as a temporary site for the transfer of street sweeping materials. The existing paved material transfer area will be relocated to the SR-60/Gilman Springs interchange area as part of the proposed project.

Tables 1-4 and 1-5 summarize the traffic conditions for build Alternatives 2 and 6.

Table 1-4. Summary of Traffic Conditions for Build Alternatives 2 and 6.

Scenario/ Analysis Year	Location	AADT		% Truck
		Total	Truck	
Alternatives 2 and 6 Year 2025	WLC Pkwy - Eucalyptus Avenue to SR-60 EB Ramps	24,242	8,744	36
	SR-60 - Redlands Boulevard to WLC Pkwy	92,116	15,490	17
	Ironwood Avenue - Redlands Boulevard to Theodore Street	2,587	638	25
	Eucalyptus Avenue - Redlands Boulevard to WLC Pkwy	1,668	861	52
Alternatives 2 and 6 Year 2045	WLC Pkwy - Eucalyptus Avenue to SR-60 EB Ramps	31,816	12,512	39
	SR-60 - Redlands Boulevard to WLC Pkwy	168,384	23,699	14
	Ironwood Avenue - Redlands Boulevard to Theodore Street	6,941	840	12
	Eucalyptus Avenue - Redlands Boulevard to WLC Pkwy	5,370	1,308	24

Source: WSP Traffic Study, September 2018.

AADT = annual average daily traffic

WLC Pkwy = World Logistics Center Parkway

Table 1-5 Summary of Future Build Intersection Conditions.

Scenario/ Analysis Year	Location	LOS	
		AM Peak Hour	PM Peak Hour
Alternative 2 Year 2025	World Logistics Center Pkwy/Eucalyptus	A	A
	World Logistics Center Pkwy/SR-60 EB Ramps	B	B
	World Logistics Center Pkwy/SR-60 WB Ramps	B	B
	Theodore St/Ironwood Ave	A	A
Alternative 6 Year 2025	World Logistics Center Pkwy/Eucalyptus	B	B
	World Logistics Center Pkwy/SR-60 EB Ramps	A	A
	World Logistics Center Pkwy/SR-60 WB Ramps	A	A
	Theodore St/Ironwood Ave	A	A
Alternative 2 Year 2045	World Logistics Center Pkwy/Eucalyptus	D	D
	World Logistics Center Pkwy/SR-60 EB Ramps	B	C
	World Logistics Center Pkwy/SR-60 WB Ramps	C	B
	Theodore St/Ironwood Ave	A	A
Alternative 6 Year 2045	World Logistics Center Pkwy/Eucalyptus	C	C
	World Logistics Center Pkwy/SR-60 EB Ramps	B	B
	World Logistics Center Pkwy/SR-60 WB Ramps	A	D
	Theodore St/Ironwood Ave	A	A

Source: WSP Traffic Study, September 2018.

LOS = level of service

WLC Pkwy = World Logistics Center Parkway

1.4.4 Comparison of Existing/Baseline and Build Alternatives

Without improvements, in the year 2045, the eastbound and westbound on-and off- ramps are anticipated to operate at unacceptable LOS (LOS E in the a.m. peak hour and F in the p.m. peak hour, respectively) and the ramp intersections with WLC Pkwy are anticipated to operate at LOS F for both the a.m. and p.m. peak hours. The westbound mainline segment on SR-60 between WLC Pkwy and Redlands Boulevard is anticipated to operate at LOS E during the a.m. peak hour. The Theodore Street intersection with Ironwood Avenue and the WLC Pkwy intersections with the SR-60 westbound and eastbound ramps and Eucalyptus Avenue are all forecast to operate at LOS F in the p.m. peak hour.

Both Alternatives 2 and 6 would reconstruct the SR-60/WLC Pkwy interchange by constructing new on- and off-ramps and would replace the existing two-lane WLC Pkwy overcrossing with a four-lane overcrossing. These improvements would improve LOS levels described above to LOS A or B. Table 1-6 summarizes design features and operational impacts on traffic conditions near the proposed project.

Table 1-6. Summary of Long-Term Operational Impacts on Traffic Conditions of Existing, No-Build, and Build Alternatives.

Scenario/ Analysis Year	Design Features and Operational Impacts on Traffic Conditions
Baseline (existing) 2018	The existing intersection configuration is sufficient to handle the current low traffic demand.
No-Build Alternative	The Baseline condition is expected to worsen with projected growth.
Build Alternative 2	Build Alternative 2 (Modified Partial Cloverleaf) would improve traffic flow without increasing the traffic volumes along WLC Pkwy or SR-60.
Build Alternative 6	Build Alternative 6 (Modified Partial Cloverleaf with Roundabout Intersections) would improve traffic flow without increasing the traffic volumes along WLC Pkwy or SR-60.

SR-60 = State Route 60
WLC Pkwy = World Logistics Center Parkway

1.5 Construction Activities and Schedule

During the construction phase of the proposed project, removal of the existing overcrossing and construction of the new overcrossing and ramps would interfere with access to the SR-60 at WLC Pkwy. The WLC Pkwy overcrossing is being evaluated for closure during construction of the proposed project. Therefore, if not done prior to this project, Eucalyptus Avenue would be extended and improved approximately 5,100 ft between WLC Pkwy and Redlands Boulevard to provide a detour route to SR-60. The improvements to Eucalyptus Avenue will be constructed early in the construction schedule, prior to the closure of the WLC Pkwy overcrossing. North of the freeway, access to SR-60 during construction would be provided via Ironwood Avenue and Redlands Boulevard. South of the freeway, access to SR-60 would be provided via Alessandro Boulevard and Gilman Springs Road and via Eucalyptus Avenue and Redlands Boulevard. Additional intersection improvements are proposed along the detour routes to facilitate vehicle movement. As a result, widening is proposed at the Redlands Boulevard/Ironwood Avenue, WLC Pkwy/Alessandro Boulevard, and Alessandro Boulevard/Gilman Springs Road intersections. Consequently, signal modifications are proposed at the Redlands Boulevard/Ironwood Avenue and Redlands Boulevard/Eucalyptus Avenue intersections. A new signal would be installed at the Gilman Springs Road/Alessandro Boulevard intersection due to the high through movements on Gilman Springs Road conflicting with left turns to and from Alessandro Boulevard. The improvements required for the detour routes also include utility adjustments and/or relocations at Redlands Boulevard/Ironwood Avenue, WLC Pkwy/Alessandro Boulevard, and Alessandro Boulevard/Gilman Springs Road.

Project construction would also involve the import of soils to the project site from a borrow site. One borrow site, the City Stockpile, is located at the northwest corner of the intersection of Alessandro Boulevard/Nason Street, approximately 2.3 mi from the western boundary of the project site. Approximately 50,000 cubic yards of import material will be imported to the project site from the City Stockpile borrow site. The City Stockpile will be environmentally cleared with this project. Additional fill material beyond the 50,000 cubic yards will be necessary for the project and will come from another site(s) to be determined during future phases of the project.

As construction is planned to last approximately 18 months, no construction activities are anticipated to last more than five years at any individual site. Emissions from construction-related activities are thus considered temporary as defined in 40 CFR 93.123(c)(5); and are not required to be included in PM hot-spot analyses to meet conformity requirements.

Table 1-7 presents the anticipated project milestone dates.

Table 1-7. Project Milestones and Dates.

Project Phase	Begin Date	Completion Date
Environmental	2014	2020
Engineering	2020	2022
Right-Of-Way	2020	2022
Construction	2022	2023

2. Regulatory Setting

Many statutes, regulations, plans, and policies have been adopted at the federal, State, and local levels to address air quality issues related to transportation and other sources. The proposed Project is subject to air quality regulations at each of these levels. This section introduces the pollutants governed by these regulations and describes the regulation and policies that are relevant to the proposed Project.

2.1 Pollutant-Specific Overview

Air pollutants are governed by multiple federal and state standards to regulate and mitigate health impacts. At the federal level, there are six criteria pollutants for which National Ambient Air Quality Standards (NAAQS) have been established: CO, Pb, NO_2, O_3, PM ($PM_{2.5}$ and PM_{10}), and SO_2. The U.S. EPA has also identified nine priority mobile source air toxics: 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter (www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/). In California, sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride are also regulated.

2.1.1 Criteria Pollutants

The Clean Air Act requires the U.S. EPA to set NAAQS for six criteria air contaminants: O_3, PM, CO, NO_2, Pb, and SO_2. It also permits states to adopt additional or more protective air quality standards if needed. California has set standards for certain pollutants. Table 2-1 documents the current air quality standards while Table 2-2 summarizes the sources and health effects of the six criteria pollutants and pollutants regulated in the State.

2.1.2 Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. The U.S. EPA has assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of U.S. EPA's Integrated Risk Information System (www.epa.gov/iris). In addition, the U.S. EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-hazard contributors from the 2011 National Air Toxics Assessment (www.epa.gov/national-air-toxics-assessment). These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter

Table 2-1. Table of State and Federal Ambient Air Quality Standards.

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page ...

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (5/4/16)**

Table 2-2. State and Federal Criteria Air Pollutant Effects and Sources.

Pollutant	Principal Health and Atmospheric Effects	Typical Sources
Ozone (O_3)	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude ozone is almost entirely formed from reactive organic gases/volatile organic compounds (ROG or VOC) and nitrogen oxides (NOx) in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.
Respirable Particulate Matter (PM_{10})	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many toxic and other aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke & vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.
Fine Particulate Matter ($PM_{2.5}$)	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the $PM_{2.5}$ size range. Many toxic and other aerosol and solid compounds are part of $PM_{2.5}$.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical and photochemical reactions involving other pollutants including NOx, sulfur oxides (SOx), ammonia, and ROG.
Carbon Monoxide (CO)	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Nitrogen Dioxide (NO_2)	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of stormwater. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.
Sulfur Dioxide (SO_2)	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.
Lead (Pb)	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in soils along major roads.
Visibility-Reducing Particles (VRP)	Reduces visibility. Produces haze. NOTE: not directly related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility issues in National Parks and other "Class I" areas. However, some issues and measurement methods are similar.	See particulate matter above. May be related more to aerosols than to solid particles.
Sulfate	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.
Hydrogen Sulfide (H_2S)	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.
Vinyl Chloride	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes.

Source: Caltrans Standard Environmental Reference (accessed November 2018).
Caltrans = California Department of Transportation
NOX = nitrogen oxide
SOX = sulfur oxides
ROG = reactive organic gases
VOC = volatile organic compounds

(diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While the FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future U.S. EPA rules.

The 2007 U.S. EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using U.S. EPA's MOVES2014a model, even if vehicle activity (vehicle-miles traveled, VMT) increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emission rate for the priority MSATs is projected for the same time period, as shown in Figure 2-1, Projected National MSAT Trends, 2010–2050.

2.1.3 Greenhouse Gases

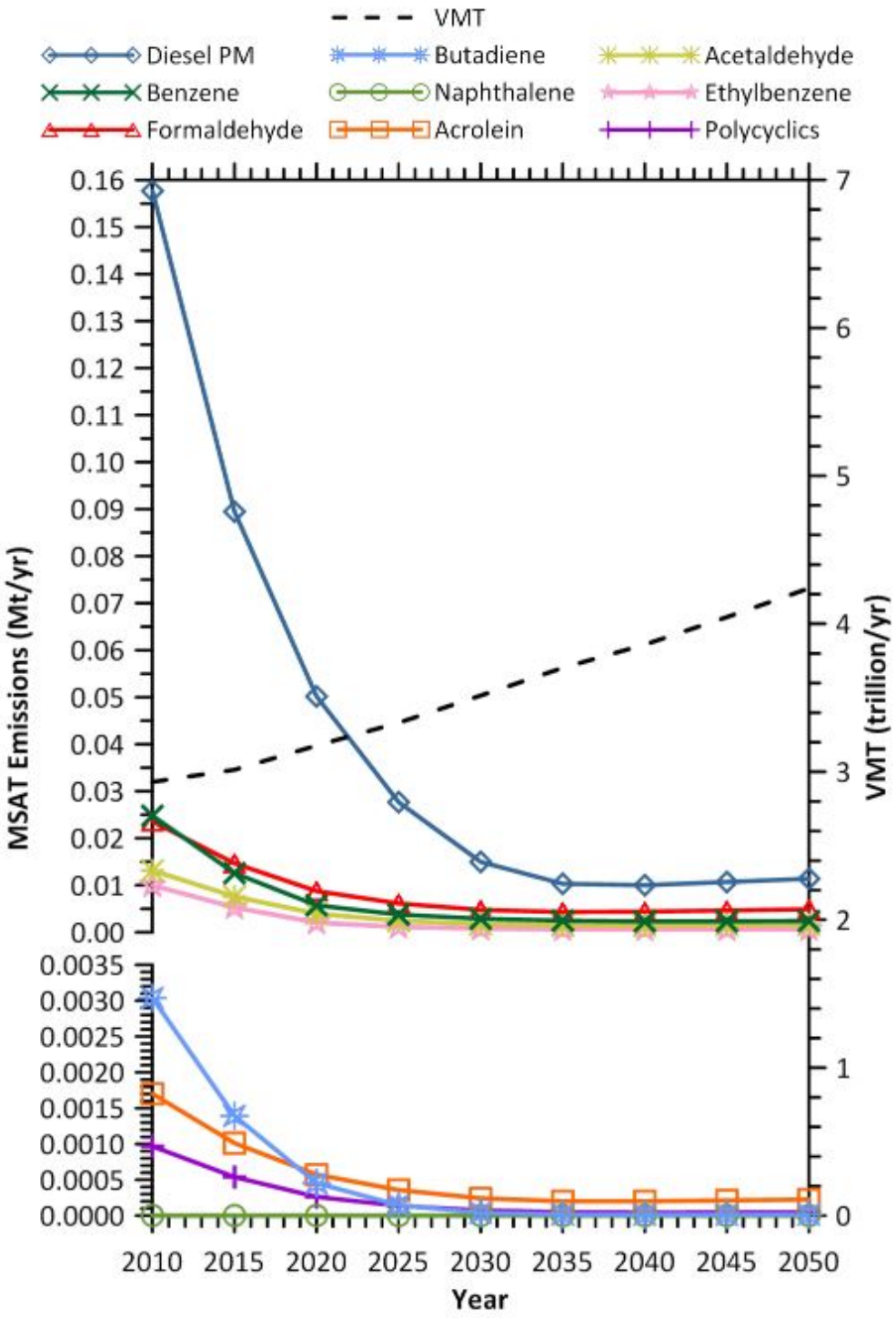
The term greenhouse gas (GHG) is used to describe atmospheric gases that absorb solar radiation and subsequently emit radiation in the thermal infrared region of the energy spectrum, trapping heat in the Earth's atmosphere. These gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and water vapor, among others. A growing body of research attributes long-term changes in temperature, precipitation, and other elements of Earth's climate to large increases in GHG emissions since the mid-19th century, particularly from human activity related to fossil fuel combustion. Anthropogenic GHG emissions of particular interest include CO_2, CH_4, N_2O, and fluorinated gases.

GHGs differ in how much heat each traps in the atmosphere (global warming potential, or GWP). CO_2 is the most important GHG, so amounts of other gases are expressed relative to CO_2, using a metric called "carbon dioxide equivalent" (CO_2e). The global warming potential of CO_2 is assigned a value of 1, and the warming potential of other gases is assessed as multiples of CO_2. For example, the 2007 International Panel on Climate Change (IPCC) *Fourth Assessment Report* calculates the GWP of CH_4 as 25 and the GWP of N_2O as 298, over a 100-year time horizon.[1] Generally, estimates of all GHGs are summed to obtain total emissions for a project or given time period, usually expressed in metric tons of CO_2e ($MTCO_2e$), or million metric tons of CO_2e ($MMTCO_2e$).[2]

As evidence has mounted for the relationship of climate changes to rising GHGs, federal and state governments have established numerous policies and goals targeted to improving energy efficiency and fuel economy, and reducing GHG emissions. Nationally, electricity generation is the largest source of GHG emissions, followed by transportation. In California, however, transportation is the largest contributor to GHGs.

[1] See Table 2.14 in IPCC Fourth Assessment Report: Climate Change 2007 (AR4): The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA. www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf.

[2] Sacramento Metropolitan Air Quality Management District. 2017. CEQA Guidance & Tools. Website: www.airquality.org/Businesses/CEQA-Land-Use-Planning/CEQA-Guidance-Tools.



Source: FHWA. Website: www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/

Figure 2-1. Projected National MSAT Trends, 2010-2050

2.1.4 Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by State, federal, and international agencies and was identified as a toxic air contaminant by CARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

Asbestos can be released from serpentine and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos-bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed.

Serpentine rock may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentine rock, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentine and/or ultramafic rock. Serpentine and/or ultramafic rocks are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology has developed a map showing the general location of ultramafic rock in the State (www.conservation.ca.gov/cgs/minerals/hazardous_minerals/asbestos/Pages/index.aspx).

2.2 Regulations

2.2.1 Federal and California Clean Air Act

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality while the California Clean Air Act (CCAA) is its companion state law. These laws and related regulations by the U.S. EPA and the CARB set standards for the concentration of pollutants in the air. At the federal level, these standards are the NAAQS. NAAQS and State of California Ambient Air Quality Standards (CAAQS) have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM_{10}) and particles of 2.5 micrometers and smaller ($PM_{2.5}$), and sulfur dioxide (SO_2). In addition, national and state standards exist for lead (Pb), and state standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety, and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air

contaminants (TACs); some criteria pollutants are also air toxics or may include certain air toxics in their general definition.

2.2.2 Transportation Conformity

The conformity requirement is based on Federal Clean Air Act (FCAA) Section 176(c), which prohibits the U.S. Department of Transportation (USDOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to a State Implementation Plan (SIP) for attaining the NAAQS. "Transportation Conformity" applies to highway and transit projects and takes place on two levels: the regional—or, planning and programming level—and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and "maintenance" (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. The U.S. EPA regulations at 40 CFR 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and in some areas (although not in California), sulfur dioxide (SO_2). California has regions designated as "attainment," "nonattainment," or "maintenance," for all of these transportation-related "criteria pollutants" except SO_2, and also has a region designated for lead (Pb); however, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years (for the RTP), and 4 years (for the FTIP). RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the Clean Air Act and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), FHWA, and Federal Transit Administration (FTA), make the determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept, scope, and "open-to-traffic" schedule of a proposed transportation project are the same as described in the RTP and the TIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming RTP and TIP and the project has a design concept and scope[3] that has not changed significantly from those in the RTP and TIP. If the design concept and scope have changed substantially from that used

[3] "Design concept" means the type of facility that is proposed, such as a freeway or arterial highway. "Design scope" refers to those aspects of the project that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the project.

in the RTP Conformity analysis, RTP and TIP amendments may be needed. Project-level conformity also needs to demonstrate that project analyses have used the latest planning assumptions and U.S. EPA-approved emissions models and that the project complies with any control measures in the SIP in PM areas. Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts.

2.2.3 National Environmental Policy Act (NEPA)

NEPA requires that policies and regulations administered by the federal government are consistent with its environmental protection goals. NEPA also requires that federal agencies use an interdisciplinary approach to planning and decision-making for any actions that could impact the environment. It requires environmental review of federal actions including the creation of Environmental Documents (EDs) that describe the environmental effects of a proposed project and its alternatives (including a section on air quality impacts).

2.2.4 Climate Change Regulations

Federal

To date, no national standards have been established for nationwide mobile-source GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level.

The National Environmental Policy Act (NEPA) (42 United States Code [USC] Part 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to making a decision on the action or project.

The Federal Highway Administration (FHWA) recognizes the threats that extreme weather, sea-level change, and other changes in environmental conditions pose to valuable transportation infrastructure and those who depend on it. FHWA therefore supports a sustainability approach that assesses vulnerability to climate risks and incorporates resilience into planning, asset management, project development and design, and operations and maintenance practices (FHWA 2019). This approach encourages planning for sustainable highways by addressing climate risks while balancing environmental, economic, and social values—"the triple bottom line of sustainability" (FHWA n.d.). Program and project elements that foster sustainability and resilience also support economic vitality and global efficiency, increase safety and mobility, enhance the environment, promote energy conservation, and improve the quality of life.

Various efforts have been promulgated at the federal level to improve fuel economy and energy efficiency to address climate change and its associated effects. The most important of these was the Energy Policy and Conservation Act of 1975 (42 USC Section 6201) and Corporate Average Fuel Economy (CAFE) Standards. This act establishes fuel economy standards for on-road motor vehicles

sold in the United States. Compliance with federal fuel economy standards is determined through the CAFE program on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the United States.

Energy Policy Act of 2005, 109th Congress H.R.6 (2005–2006): This act sets forth an energy research and development program covering: (1) energy efficiency; (2) renewable energy; (3) oil and gas; (4) coal; (5) the establishment of the Office of Indian Energy Policy and Programs within the Department of Energy; (6) nuclear matters and security; (7) vehicles and motor fuels, including ethanol; (8) hydrogen; (9) electricity; (10) energy tax incentives; (11) hydropower and geothermal energy; and (12) climate change technology.

The U.S. EPA[4] in conjunction with the National Highway Traffic Safety Administration (NHTSA) is responsible for setting GHG emission standards for new cars and light-duty vehicles to significantly increase the fuel economy of all new passenger cars and light trucks sold in the United States. The current standards require vehicles to meet an average fuel economy of 34.1 miles per gallon by 2016. EPA and NHTSA are currently considering appropriate mileage and GHG emissions standards for 2022–2025 light-duty vehicles for future rulemaking.

NHTSA and EPA issued a Final Rule for "Phase 2" for medium- and heavy-duty vehicles to improve fuel efficiency and cut carbon pollution in October 2016. The agencies estimate that the standards will save up to 2 billion barrels of oil and reduce CO_2 emissions by up to 1.1 billion metric tons over the lifetimes of model year 2018–2027 vehicles.

State

California has been innovative and proactive in addressing GHG emissions and climate change by passing multiple Senate and Assembly bills and executive orders (EOs) including, but not limited to, the following:

EO S-3-05 (June 1, 2005): The goal of this EO is to reduce California's GHG emissions to: (1) year 2000 levels by 2010, (2) year 1990 levels by 2020, and (3) 80 percent below year 1990 levels by 2050. This goal was further reinforced with the passage of Assembly Bill (AB) 32 in 2006 and Senate Bill (SB) 32 in 2016.

AB 32, Chapter 488, 2006, Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 codified the 2020 GHG emissions reduction goals outlined in EO S-3-05, while further mandating that the California Air Resources Board (CARB) create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." The Legislature also intended that

[4] U.S. EPA's authority to regulate GHG emissions stems from the U.S. Supreme Court decision in Massachusetts *v.* EPA (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, U.S. EPA finalized an endangerment finding in December 2009. Based on scientific evidence it found that six GHGs constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing Act and EPA's assessment of the scientific evidence that form the basis for EPA's regulatory actions (U.S. EPA 2009).

the statewide GHG emissions limit continue in existence and be used to maintain and continue reductions in emissions of GHGs beyond 2020 (Health and Safety Code [H&SC] Section 38551(b)). The law requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.

EO S-01-07 (January 18, 2007): This order sets forth the low carbon fuel standard (LCFS) for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by the year 2020. CARB re-adopted the LCFS regulation in September 2015, and the changes went into effect on January 1, 2016. The program establishes a strong framework to promote the low-carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG reduction goals.

SB 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires CARB to set regional emissions reduction targets for passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land-use, and housing policies to plan how it will achieve the emissions target for its region.

SB 391, Chapter 585, 2009, California Transportation Plan: This bill requires the State's long-range transportation plan to identify strategies to address California's climate change goals under AB 32.

EO B-16-12 (March 2012) orders State entities under the direction of the Governor, including CARB, the California Energy Commission, and the Public Utilities Commission, to support the rapid commercialization of zero-emission vehicles. It directs these entities to achieve various benchmarks related to zero-emission vehicles.

EO B-30-15 (April 2015) establishes an interim statewide GHG emission reduction target of 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050. It further orders all state agencies with jurisdiction over sources of GHG emissions to implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets. It also directs CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent ($MMTCO_2e$).[5] Finally, it requires the Natural Resources Agency to update the state's climate adaptation strategy, *Safeguarding California*, every 3 years, and to ensure that its provisions are fully implemented.

SB 32, Chapter 249, 2016, codifies the GHG reduction targets established in EO B-30-15 to achieve a mid-range goal of 40 percent below 1990 levels by 2030.

SB 1386, Chapter 545, 2016, declared "it to be the policy of the state that the protection and management of natural and working lands … is an important strategy in meeting the state's greenhouse gas reduction goals, and would require all state agencies, departments, boards, and

[5] GHGs differ in how much heat each trap in the atmosphere (global warming potential, or GWP). CO_2 is the most important GHG, so amounts of other gases are expressed relative to CO_2, using a metric called "carbon dioxide equivalent" (CO_2e). The global warming potential of CO_2 is assigned a value of 1, and the GWP of other gases is assessed as multiples of CO_2.

commissions to consider this policy when revising, adopting, or establishing policies, regulations, expenditures, or grant criteria relating to the protection and management of natural and working lands."

AB 134, Chapter 254, 2017, allocates Greenhouse Gas Reduction Funds and other sources to various clean vehicle programs, demonstration/pilot projects, clean vehicle rebates and projects, and other emissions-reduction programs statewide.

Senate Bill 743**,** Chapter 386 (September 2013): This bill changes the metric of consideration for transportation impacts pursuant to CEQA from a focus on automobile delay to alternative methods focused on vehicle miles travelled, to promote the state's goals of reducing greenhouse gas emissions and traffic related air pollution and promoting multimodal transportation while balancing the needs of congestion management and safety.

Senate Bill 150**,** Chapter 150 2017, Regional Transportation Plans: This bill requires CARB to prepare a report that assesses progress made by each metropolitan planning organization in meeting their established regional greenhouse gas emission reduction targets.

Executive Order B-55-18, (September 2018) sets a new statewide goal to achieve and maintain carbon neutrality no later than 2045. This goal is in addition to existing statewide targets of reducing GHG emissions.

2.2.5 California Environmental Quality Act (CEQA)

CEQA[6] is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA documents address CCAA requirements for transportation projects. While state standards are often more strict than federal standards, the state has no conformity process.

2.2.6 Local

The U.S. EPA has delegated responsibility to air districts to establish local rules to protect air quality. Caltrans' Standard Specification 14-9.02 (Caltrans 2015) requires compliance with all applicable air quality laws and regulations including local and air district ordinances and rules.

The SCAQMD and the SCAG are responsible for formulating and implementing the AQMP for the South Coast Air Basin (SCAB). The main purpose of an AQMP is to bring the area into compliance with federal and State air quality standards. Every 3 years, SCAQMD prepares a new AQMP, updating the previous plan and 20-year horizon (SCAQMD 2016).

[6] For general information about CEQA, see California Natural Resources Agency. 2014. Website: resources.ca.gov/ceqa/more/faq.html.

SCAQMD approved the 2016 AQMP on March 3, 2017, and submitted the plan to CARB on March 10, 2017. Key elements of the 2016 AQMP include the following:

- Calculating and taking credit for co-benefits from other planning efforts (e.g., climate, energy, and transportation)
- A strategy with fair-share emission reductions at the federal, State, and local levels
- Investment in strategies and technologies meeting multiple air quality objectives
- Seeking new partnerships and significant funding for incentives to accelerate deployment of zero-emission and near-zero-emission technologies
- Enhanced socioeconomic assessment, including an expanded environmental justice analysis
- Attainment of the 24-hour $PM_{2.5}$ standard in 2019 with no additional measures
- Attainment of the annual $PM_{2.5}$ standard by 2025 with implementation of a portion of the O_3 strategy
- Attainment of the 1-hour O_3 standard by 2022 with no reliance on "black box" future technology (CAA Section 182(e)(5) measures)

The SCAG is responsible under the CAA for determining the conformity of projects, plans, and programs with the SCAQMD AQMP. As indicated in the SCAQMD *CEQA Air Quality Handbook* (1993), there are two main indicators of consistency:

- Whether the project would result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and
- Whether the project would exceed the AQMP's assumptions for 2020 or increments based on the year of project build out and phase.

3. Affected Environment

The topography of a region can substantially impact air flow and resulting pollutant concentrations. California is divided into 15 air basins with similar topography and meteorology to better manage air quality throughout the state. Each air basin has a local air district that is responsible for identifying and implementing air quality strategies to comply with ambient air quality standards.

The project site is entirely within the South Coast Air Basin (SCAB), which includes the western portions of Riverside and San Bernardino Counties, as well as Los Angeles County and Orange County. Air quality regulation in the SCAB is administered by SCAQMD. 2017 population for Riverside County is 2. 4 million and the growth rate is calculated as 4.28 percent. Riverside and San Bernardino counties comprise what is commonly known as the Inland Empire, one of the fastest growing metropolitan areas in the nation. Riverside County is bordered by San Bernardino County to the north, Orange County to the west, San Diego and Imperial counties to the south and the state of Arizona to the east.

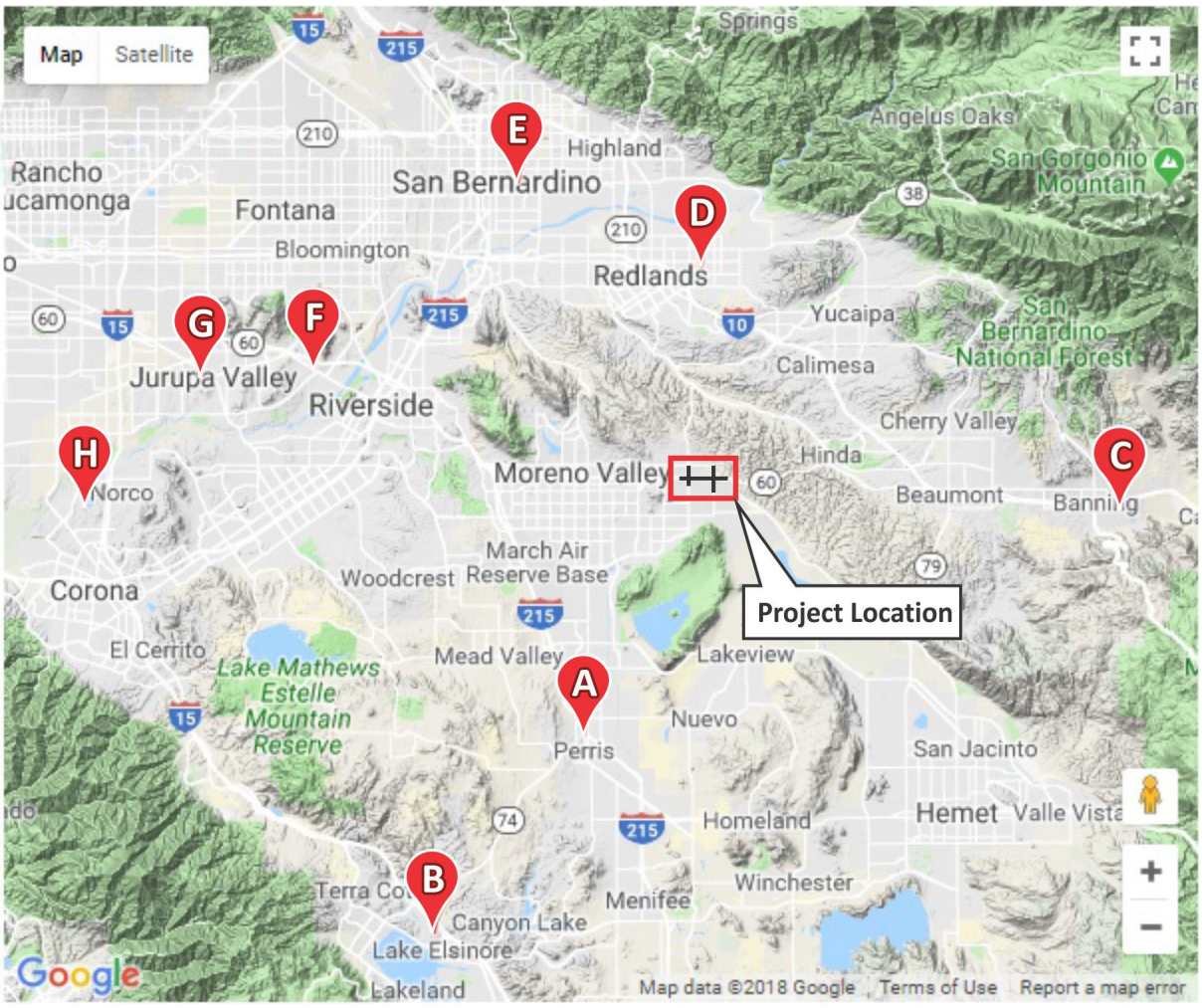
3.1 Climate, Meteorology, and Topography

Meteorology (weather) and terrain can influence air quality. Certain weather parameters are highly correlated to air quality, including temperature, the amount of sunlight, and the type of winds at the surface and above the surface. Winds can transport ozone and ozone precursors from one region to another, contributing to air quality problems downwind of source regions. Furthermore, mountains can act as a barrier that prevents ozone from dispersing.

The SCAQMD operates several air quality monitoring stations in the project area. Figure 3-1, Map of Air Quality Monitoring Stations Located Near the Project, shows the locations of the air quality monitoring stations near the proposed project.

The Riverside climatological station, maintained by SCAQMD, is located near the project site and is representative of meteorological conditions near the proposed project. Figure 3-2, Predominant Wind Patterns Near the Project, shows a wind rose[7] illustrating the predominant wind patterns near the proposed project. The climate of the project area is generally Mediterranean in character, with cool winters (average 43 °Fahrenheit [°F] in January) and warm, dry summers (average 94 °F in July).[8] Temperature inversions are common, affecting localized pollutant concentrations in the winter and enhancing ozone formation in the summer. Mountains averaging 10,000 feet in altitude tend to trap pollutants in the region by limiting air flow. Annual average rainfall is 10.32 inches (at the Riverside station), mainly falling during the winter months.

[7] A wind rose provides a succinct view of how wind speed and direction are typically distributed at a particular location. Presented in a circular format, the wind rose shows the frequency of winds blowing from particular directions.
[8] Data from U.S. Climate Data. Website: www.usclimatedata.com/climate/riverside/california/united-states/usca1695, accessed November 2018.



Site A: Perris
Site B: Lake Elsinore
Site C: Banning
Site D: Redlands
Site E: San Bernardino
Site F: Riverside
Site G: Jurupa Valley
Site H: Norco

Figure 3-1. Map of Air Quality Monitoring Stations Located Near the Project

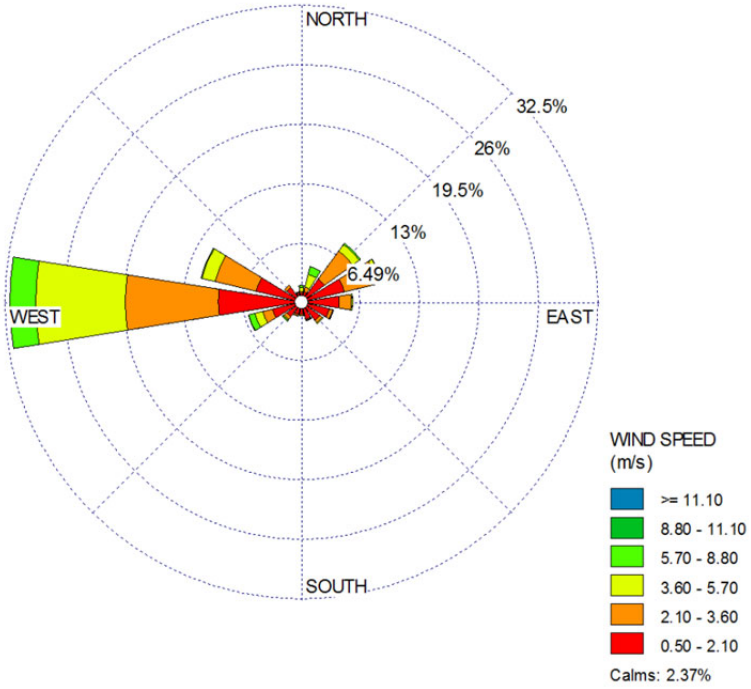


Figure 3-2. Predominant Wind Patterns Near the Project.

3.2 Existing Air Quality

This section summarizes existing air quality conditions near the proposed project area. It includes attainment statuses for criteria pollutants, describes local ambient concentrations of criteria pollutants for the past 5 years, and discusses MSAT and GHG emissions.

3.2.1 Criteria Pollutants and Attainment Status

Air quality monitoring stations are located throughout the nation and are maintained by local air districts and State air quality regulating agencies. Data collected at permanent monitoring stations are used by the EPA to identify regions as "attainment," "nonattainment," or "maintenance," depending on whether the regions meet the requirements stated in the primary NAAQS.

Nonattainment areas are imposed with additional restrictions as required by the EPA. In addition, different classifications of nonattainment (e.g., marginal, moderate, serious, severe, and extreme) are used to classify each air basin in the State on a pollutant-by-pollutant basis. The classifications are used as a foundation to create air quality management strategies to improve air quality and comply with the NAAQS. Table 3-1 lists the State and federal attainment status for all regulated pollutants.

Table 3-1. State and Federal Attainment Status for the South Coast Air Basin

Pollutant	State Attainment Status	Federal Attainment Status
Ozone (O_3)	Nonattainment (1-hour and 8-hour)	Extreme Nonattainment (8-hour)
Respirable Particulate Matter (PM_{10})	Nonattainment	Attainment/Maintenance
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Moderate Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment/Maintenance
Nitrogen Dioxide (NO_2)	Attainment	Attainment/Maintenance
Sulfur Dioxide (SO_2)	Attainment/Unclassified	Attainment/Unclassified
Lead (Pb)	Nonattainment (Los Angeles County only)	Nonattainment (Los Angeles County only)
Visibility-Reducing Particles	Attainment/Unclassified	N/A
Sulfates	Attainment/Unclassified	N/A
Hydrogen Sulfide	Attainment/Unclassified	N/A
Vinyl Chloride	Attainment/Unclassified	N/A

Source: CARB. Air Quality Standards and Area Designations. Website:www.arb.ca.gov/desig/desig.htm (accessed November 2019).
CARB = California Air Resources Board
N/A = not applicable

The SCAQMD Riverside-Rubidoux Air Quality Monitoring Station at 5888 Mission Blvd. in Rubidoux monitors five of the six criteria pollutants (O_3, CO, PM_{10}, $PM_{2.5}$, and NO_2). The project region is in attainment for SO2, and ambient levels of SO2 have historically been so low that SO2 is no longer monitored. Table 3-2 lists air quality trends identified for data collected between 2014 and 2018.

Table 3-2. Air Quality Concentrations for the Past 5 Years Measured at the Riverside-Rubidoux Station

Pollutant	Standard	2014	2015	2016	2017	2018
Ozone						
Max 1-hr concentration (ppm)		0.141	0.132	0.142	0.145	0.123
No. days exceeded: State	> 0.09 ppm	29	31	33	47	22
Ozone						
Max 8-hr concentration (ppm)		0.104	0.105	0.104	0.118	0.101
No. days exceeded: State	> 0.07 ppm	66	55	69	81	53
Federal	> 0.07 ppm	66	55	69	81	53
Carbon Monoxide						
Max 1-hr concentration (ppm)		2.4	4.1	1.7	2.4	2.2
No. days exceeded: State	> 20 ppm	0	0	0	0	0
Federal	> 35 ppm	0	0	0	0	0
Max 8-hr concentration (ppm)		1.9	1.7	1.3	1.8	2.0
No. days exceeded: State	>9.0 ppm	0	0	0	0	0
Federal	>9.0 ppm	0	0	0	0	0
Particulate matter less than 10 microns in size (PM_{10})						
Max 24-hr concentration ($\mu g/m^3$)		100	69	84	92	87
No. days exceeded: State	> 50 $\mu g/m^3$	119	87	60	98	127
Federal	> 150 $\mu g/m^3$	0	0	0	0	0
Annual avg. concentration ($\mu g/m^3$)		36.6	32.0	37.8	39.4	35.4
Exceeds Standard? State	> 20 $\mu g/m^3$	Yes	Yes	Yes	Yes	Yes
Particulate matter less than 2.5 microns in size ($PM_{2.5}$)						
Max 24-hr concentration ($\mu g/m^3$)		48.9	54.7	51.6	50.3	66.3
No. days exceeded: Federal	> 35 $\mu g/m^3$	5	9	5	7	3
Annual avg. concentration ($\mu g/m^3$)		16.8	15.3	12.6	14.5	12.6
Exceeds Standard? State	> 12 $\mu g/m^3$	Yes	Yes	Yes	Yes	Yes
Federal	> 15 $\mu g/m^3$	Yes	Yes	No	No	No
Nitrogen Dioxide						
Max 1-hr concentration (ppb)		59.9	57.4	73.1	63.0	55.4
No. days exceeded: State	> 180 ppb	0	0	0	0	0
Federal	> 100 ppb	0	0	0	0	0
Annual avg. concentration (ppb)		15.1	14.4	14.9	15.0	14.3
Exceeds Standard? State	> 30 ppb	No	No	No	No	No
Federal	> 53 ppb	No	No	No	No	No

Source: U.S. EPA, Air Quality Data. Website: www.epa.gov/outdoor-air-quality-data (accessed November 2019).

$\mu g/m^3$ = micrograms per cubic meter
avg. = average
hr = hour
max = maximum
PM_{10} = particulate matter less than 10 microns in size
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
ppb = parts per billion
ppm = parts per million
U.S. EPA = United States Environmental Protection Agency

3.2.2 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, the EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories and refineries).

Controlling air toxic emissions became a national priority with the passage of the CAA Amendments of 1990, whereby Congress mandated the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (*Federal Register*, Volume 73, No. 201, page 61,358; October 16, 2008)

and identified a group of 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System (IRIS). In addition, the EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from its 2011 National Air Toxics Assessment. These are acrolein, benzene, 1,3-butadiene, acetaldehyde, diesel PM, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While the FHWA considers these the priority Mobile Source Air Toxics (MSAT), the list is subject to change and may be adjusted in consideration of future EPA rules. Table 3-3 lists the ambient concentrations of the MSATs in the project vicinity.

Table 3-3. Mobile Source Air Toxic Measured Concentrations in the Project Vicinity

MSAT	Unit	Measured Maximums				
		2013	2014	2015	2016	2017
Acrolein	ppb	3.7	3.5	1.0	1.3	0.6
Benzene	ppb	1.1	0.69	0.62	0.82	1.1
1,3-Butadiene	ppb	0.33	0.20	0.23	0.17	0.17
Acetaldehyde	ppb	4.0	2.8	2.6	2.7	2.8
Ethylbenzene	ppb	0.5	0.3	0.3	0.9	0.5
Formaldehyde	ppb	7.5	6.5	6.7	7.7	7.4

Source: CARB, website: www.arb.ca.gov/adam/toxics/toxics.html (accessed November 2019).
Notes: Data from Riverside-Rubidoux Station
The diesel PM, naphthalene, and polycyclic organic matter MSATs are not monitored.
CARB = California Air Resources Board
MSAT = Mobile Source Air Toxics
PM = particulate matter

3.2.3 Greenhouse Gas and Climate Change

The proposed project is at the edge of an urban setting in the city of Moreno Valley. The northeast quadrant of the interchange is located in unincorporated Riverside County but within the City's sphere of influence. Approximately 61 percent of the acreage in the project area is designated Vacant, followed by Open Space and Recreation at approximately 18 percent, and Agriculture at approximately 3 percent. Other land uses in the study area include commercial and services, facilities, industrial, residential, mobile homes and trailer parks, transportation, communications, and utilities, as shown on.

The city is bounded on three sides by mountains and hills. The SR-60/WLC Pkwy interchange and the other SR-60 interchanges in Moreno Valley provide regional access to the city. I-10, a major interstate freeway, connects to SR-60 approximately 8.5 mi east of WLC Pkwy in Beaumont. SR-60 provides a regional connection between Los Angeles, Riverside, and San Bernardino Counties through its interchanges with I-215, I-10, SR-71, SR-57, I-605, I-710, and I-5. The project area and its vicinity are served by the Riverside Transit Agency (RTA). The RTA provides extensive fixed-route bus systems. RTA Routes and the Amtrak Thruway and Neighborhood operate within Moreno Valley.

SR-60 is functionally classified as an Urban Principal Arterial serving intraregional, interregional, and interstate travel. It is a major truck route; 16 percent of the annual average daily traffic on SR-60 in the project vicinity was truck traffic. WLC Pkwy is in the eastern half of the city, designated in the City's Circulation Plan as a Minor Arterial north of Eucalyptus Avenue and as a Major Arterial south of Eucalyptus Avenue.

The SR-60/WLC Pkwy interchange is an access point for existing and planned logistics facilities. The City of Moreno Valley and Riverside County are anticipated to continue to grow as logistics hubs for the region. While current traffic LOS is acceptable, this growth as well as increases in jobs and population are expected to reduce LOS to unacceptable levels by 2045 (see *Traffic Study Report*). The SCAG RTP/SCS guides transportation development in the project area.

A GHG emissions inventory estimates the amount of GHGs discharged into the atmosphere by specific sources over a period of time, such as a calendar year. Tracking annual GHG emissions allows countries, states, and smaller jurisdictions to understand how emissions are changing and what actions may be needed to attain emission reduction goals. U.S. EPA is responsible for documenting GHG emissions nationwide, and the CARB does so for the state, as required by H&SC Section 39607.4.

National GHG Inventory

The U.S. EPA prepares a national GHG inventory every year and submits it to the United Nations in accordance with the Framework Convention on Climate Change. The inventory provides a comprehensive accounting of all human-produced sources of GHGs in the United States, reporting emissions of CO_2, CH_4, N_2O, HFCs, perfluorocarbons, SF_6, and nitrogen trifluoride. It also accounts for emissions of CO_2 that are removed from the atmosphere by "sinks" such as forests, vegetation, and soils that uptake and store CO_2 (carbon sequestration). As shown in Figure 3-3, the 1990–2016 inventory found that of 6,511 $MMTCO_2e$ GHG emissions in 2016, 81% consist of CO_2, 10% are CH_4, and 6% are N_2O; the balance consists of fluorinated gases (EPA 2018a). In 2016, GHG emissions from the transportation sector accounted for nearly 28.5% of U.S. GHG emissions.

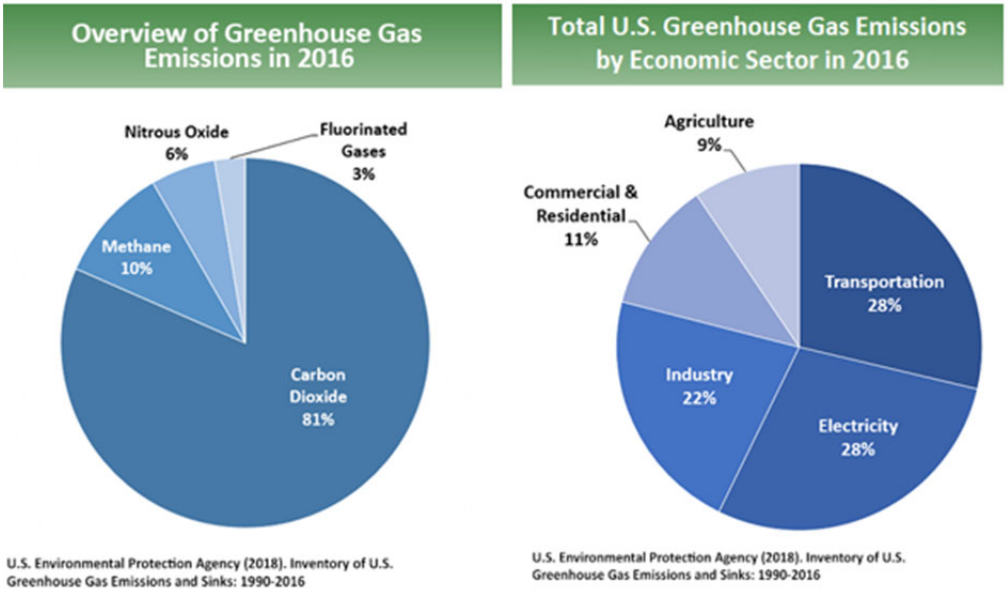


Figure 3-3. United States 2016 Greenhouse Gas Emissions

State GHG Inventory

CARB collects GHG emissions data for transportation, electricity, commercial/residential, industrial, agricultural, and waste management sectors each year. It then summarizes and highlights major annual changes and trends to demonstrate the state's progress in meeting its GHG reduction goals. As shown in Figure 3-4, the 2019 edition of the GHG emissions inventory found total California emissions of 424.1 $MMTCO_2e$ for 2017, with the transportation sector responsible for 41% of total GHGs. As shown in Figure 3-5, it also found that overall statewide GHG emissions declined from 2000 to 2017 despite growth in population and state economic output (CARB 2019a).

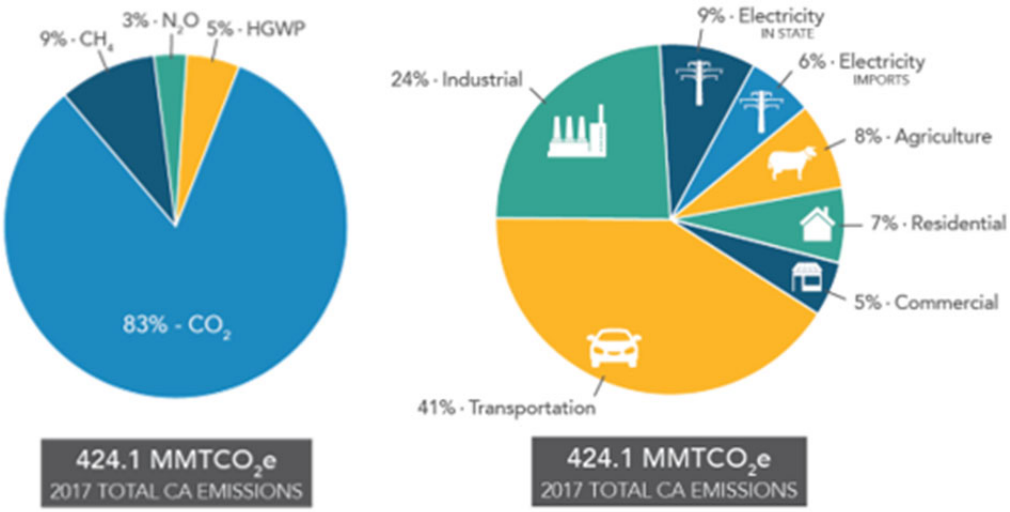


Figure 3-4. California 2017 Greenhouse Gas Emissions

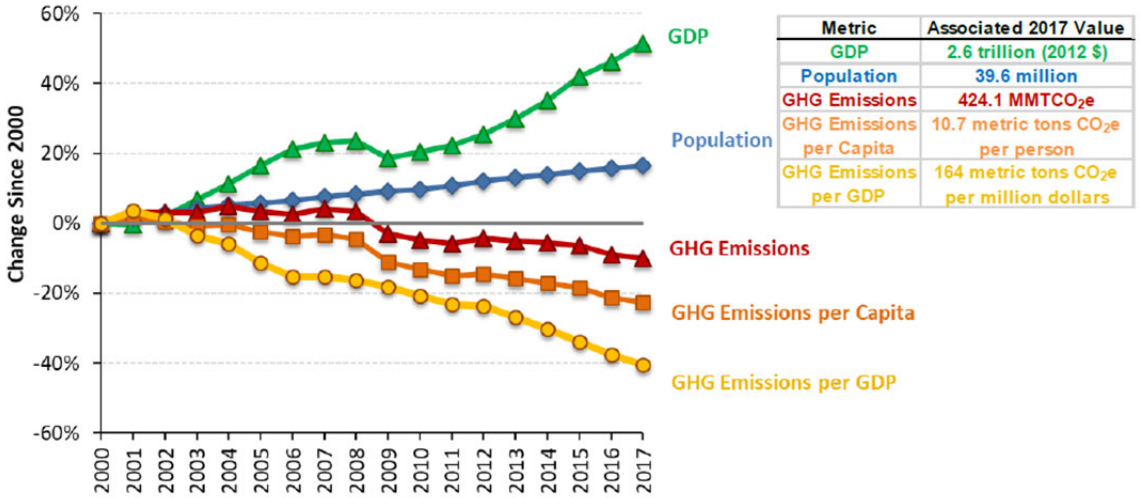


Figure 3-5. Change In California GDP, Population, And GHG Emissions Since 2000

AB 32 required CARB to develop a Scoping Plan that describes the approach California will take to achieve the goal of reducing GHG emissions to 1990 levels by 2020, and to update it every 5 years. CARB adopted the first scoping plan in 2008. The second updated plan, *California's 2017 Climate Change Scoping Plan*, adopted on December 14, 2017, reflects the 2030 target established in EO B-30-15 and SB 32. The AB 32 Scoping Plan and the subsequent updates contain the main strategies California will use to reduce GHG emissions.

Regional Plans

CARB sets regional targets for California's 18 MPOs to use in their RTP/SCSs to plan future projects that will cumulatively achieve GHG reduction goals. Targets are set at a percent reduction of passenger vehicle GHG emissions per person from 2005 levels. The proposed project is included in the RTP/SCS for SCAG. The regional reduction targets for SCAG are 8 percent by 2020 and 19 percent by 2035 (CARB 2019c). The proposed project is listed in the 2016 financially constrained RTP/SCS Amendment No. 3. The Riverside County Congestion Management Program (CMP) and the Circulation Element of the City of Moreno Valley's General Plan (2006) also address transportation sustainability in the project area. The *City of Moreno Valley's Greenhouse Gas Analysis* (2012) established goals and policies that incorporate environmental sustainability in management of city resources and infrastructure. The City established a goal of reducing its GHG emissions from all sectors by 15 percent below 2007 levels by 2020 to help meet the statewide GHG reduction goals of AB 32. The *City of Moreno Valley Energy Efficiency and Climate Action Strategy* (2012) recommends energy and GHG reduction measures similar to and consistent with those of the Greenhouse Gas Analysis, City and County general plans, and the RTP/SCS. Examples of policies related to GHGs and sustainability are listed in Table 3.4.

Table 3.4 Regional Plans and Policies Related to Greenhouse Gases

Title	GHG Reduction Policies or Strategies
Southern California Association of Governments 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy (adopted April 7, 2016)	• Preserve Our Existing System • Manage Congestion • Transportation Systems Management
Riverside County General Plan	**Land Use Element** • Policy LU 2.1k(f): f. Site development to capitalize upon multi-modal transportation opportunities and promote compatible land use arrangements that reduce reliance on the automobile. • Policy LU 11.4: Provide options to the automobile in communities, such as transit, bicycle and pedestrian trails, to help improve air quality. • Policy LU 13.4: Incorporate safe and direct multi-modal linkages in the design and development of projects, as appropriate. **Circulation Element**, • Policy C 1.2: Support development of a variety of transportation options for major employment and activity centers including direct access to transit routes, primary arterial highways, bikeways, park-n-ride facilities and pedestrian facilities. • Policy C 1.7: Encourage and support the development of projects that facilitate and enhance the use of alternative modes of transportation, including pedestrian-oriented retail and activity centers, dedicated bicycle lanes and paths, and mixed-use community centers. • Policy C 5.2: Encourage the use of drought-tolerant native plants and the use of recycled water for roadway landscaping. • Policy C 20.14 (Previously C 20.12): Encourage the use of alternative non-motorized transportation and the use of non-polluting vehicles.
Riverside County General Plan Amendments (Adopted July 17, 2018)	**Air Quality Element** • Policy AQ 20.1: Reduce VMT by requiring expanded multi-modal facilities and services that provide transportation alternatives, such as transit, bicycle and pedestrian modes. Improve connectivity of the multi-modal facilities by providing linkages between various uses in the developments. • Policy AQ 20.3: Reduce VMT and GHG emissions by improving circulation network efficiency. **Circulation Element (Amendment No. 960 – Public Review Draft, February 2015)** • Policy C 1.8: Ensure that all development applications comply with the California Complete Streets Act of 2008 as set forth in California Government Code Sections 65040.2 and 65302.
Riverside County Climate Action Plan (2018)	**Transportation Measures** • R2-T5: Roadway Improvements including Signal Synchronization and Transportation Flow Management • R2-T6: Provide a Comprehensive System of Facilities for Non-motorized Transportation

	• R2-T8: Anti-Idling Enforcement **Energy Measures** R2-E8: Induction Streetlight Retrofits
Western Riverside Council of Governments Subregional Climate Action Plan (2014)	**Measure SR-11: Goods Movement** **Measru T-1: Bicycle Infrastructure Improvements**
City of Moreno General Plan (Adopted 2006)	**Parks, Recreation, and Open Space Element** • Trails System Policies 4.3.1, 4.3.2, 4.3.4, • Programs Policies 4-3, 4-10, 4-12, 4-13 **Circulation Element** • Maximize Efficiency Policies 5.4.1, 5.4.6, 5.4.7 • Pedestrian Facilities Policies 5.9.1, 5.9.2, 5.9.3, 5.9.4 • Encourage Bicycling Policies 5.10.1, 5.10.2, 5.10.3, 5.10.4
City of Moreno Greenhouse Gas Analysis (2006)	**Measure R1-T7: Goods Movement Efficiency Measures.** System wide efficiency improvements in goods movement to achieve GHG reductions from reduced diesel combustion **Measure R1-S2: CalGreen Construction Waste Reduction.** At least 50% of non-hazardous construction and demolition debris must be recycled or salvaged.

3.3 Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than the general population. Sensitive populations (sensitive receptors) that are in proximity to localized sources of toxics and CO are of particular concern. Land uses considered to be sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive land uses located directly adjacent to the project area include rural residences as depicted in Figure 1-1.

3.4 Conformity Status

The Transportation Conformity Rule is based on CAA Section 176(c), which prohibits the U.S. Department of Transportation (USDOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the State Implementation Plan (SIP) for attaining the NAAQS. Conformity applies to highway and transit projects and takes place on two levels: the regional (or planning and programming) level and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and maintenance (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. EPA regulations at 40 CFR 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for the NAAQS and do not apply at all for State standards regardless of the status of the area.

3.4.1 Regional Conformity

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO_2, O_3, PM_{10}, and $PM_{2.5}$, and in some areas (although not in California), SO_2. California has nonattainment or maintenance areas for all of these transportation-related "criteria pollutants" except SO_2, and also has a nonattainment area for lead; however, the CAA does not currently require lead to be covered in transportation conformity analysis.

As part of the Clean Air Rules of 2004, the EPA published a final rule in the *Federal Register* on July 1, 2004, to amend the Transportation Conformity Rule to include criteria and procedures for the new 8-hour O_3 and $PM_{2.5}$ NAAQS. The final rule addressed a March 2, 1999, court decision by incorporating EPA and USDOT guidance. On July 20, 2004, the EPA published a technical correction notice to correct two minor errors in the July 1, 2004, notice. To remain consistent with the stricter federal standards, CARB approved a new 8-hour O_3 standard (0.07 parts per million [ppm], not to be exceeded) on April 28, 2005. Additionally, CARB retained the current 1-hour-average standard for O_3 (0.09 ppm) and the current monitoring method for O_3, which uses the ultraviolet photometry method.

Table 2 of 40 CFR, Section 93.126 lists the types of projects that are exempt. The proposed freeway ramp reconfiguration is not one of the exempt projects listed in Table 2. Therefore, the proposed project is not exempt from all emissions analyses. Projects that are included in Table 3 of 40 CFR, Section 93.127 are exempt from regional conformity. Because the proposed project would reconfigure ramps for an existing highway, it is not exempt from regional emissions analysis.

The proposed project is in an attainment/maintenance area for the federal CO standard; therefore, the proposed project is subject to a regional conformity determination.

The proposed project is listed in the 2016 RTP/SCS Amendment No. 3 which was adopted by SCAG on September 6, 2018. The proposed project is listed in the 2019 FTIP under the ID # RIV080904. The 2019 FTIP was approved by SCAG on September 1, 2018 and by FTA and FHWA on December 17, 2018. The design concept and scope of the proposed project is consistent with the project description in the 2016 RTP and 2019 FTIP and the "open to traffic" assumptions of the SCAG's regional emissions analysis. Conformity status information is summarized in Table 3-5. Copies of relevant pages from the RTP/SCS and FTIP are included in Appendix A.

Table 3-5. Status of Plans Related to Regional Conformity

MPO	Plan/TIP	Date of adoption by MPO	Date of Approval by FHWA	Last Amendment	Date of Approval by FHWA of Last Amendment
SCAG	Regional Transportation Plan/Sustainable Communities Strategy	April 7, 2016	June 2016	Amendment No. 3	December 17, 2018
SCAG	Transportation Improvement Program (FSTIP approval)	September 1, 2018	December 17, 2018	N/A	N/A

FHWA = Federal Highway Administration
FSTIP = Federal Statewide Transportation Improvement Program
MPO = Metropolitan Planning Organization
SCAG = Southern California Association of Governments
TIP = Transportation Improvement Program

3.4.2 Project-Level Conformity

The proposed project is located in an attainment/maintenance area for federal CO standards, a nonattainment area for federal PM2.5 and an attainment/maintenance area for federal PM10 standards, thus a project-level hot-spot analysis is required under 40 CFR 93.109 for all three pollutants. See Appendix B for the Interagency Consultation Documentation showing PM determinations. The proposed project does not cause or contribute to any new localized CO, PM2.5, and/or PM10 violations, or delay timely attainment of any NAAQS or any required interim emission reductions or other milestones during the timeframe of the transportation plan (or regional emissions analysis).

3.4.3 Interagency Consultation

On October 23, 2018, the SCAG Transportation Conformity Working Group (TCWG) determined that the project was not a project of air quality concern (POAQC). Membership of the TCWG includes federal (US EPA, FHWA, and FTA), State (CARB and Caltrans), regional (Air Quality Management Districts and SCAG), and sub-regional (County Transportation Commissions) agencies and other stakeholders. Per the transportation conformity rules and regulations, all nonexempt projects must go through review by the TCWG. The proposed project was approved and concurred upon by Interagency Consultation at the TCWG meeting as a project not having adverse impacts on air quality, and the proposed project meets the requirements of the CAA and 40 CFR, Section 93.116. A copy of the TCWG finding is included in Appendix B.

3.5 NEPA Analysis/Requirement

NEPA applies to all projects that receive federal funding or involve a federal action. NEPA requires that all reasonable alternatives for the proposed project are rigorously explored and objectively evaluated. As described above, the proposed project is listed in a conforming RTP and FTIP. Project construction will last less than 3 years and will not substantially impact traffic due to detours, road closures, and temporary terminations. Thus, impacts of the resulting traffic flow changes do not need to be analyzed.

3.6 CEQA Analysis/Requirement

CEQA applies to most California transportation projects (certain projects are statutorily exempt). CEQA requires that a range of reasonable alternatives to the project that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project are explored. This air quality study addresses pollutants for which California has established air quality standards (O_3, PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, lead, visibility-reducing particles, sulfates, H_2S, and vinyl chloride), as well as GHGs, MSATs, and asbestos. Similar to NEPA, the analysis/documentation requirements for CEQA vary by pollutant, ranging from a narrative describing that the pollutant is typically not a transportation issue to an emissions analysis. Since construction would not last more than 3 years nor substantially impact traffic due to detours, road closures, and temporary terminations, then impacts of the resulting traffic flow changes do not need to be analyzed. For CEQA analyses emissions from the future year Build scenarios are compared to emissions from the Baseline (existing conditions). The difference between future No Build and Build conditions may help inform significance determinations, which will be made by the Project Development Team (PDT).

4. Environmental Consequences

This section describes the methods, impact criteria, and results of air quality analyses of the proposed project. Analyses in this report were conducted using methodology and assumptions that are consistent with the requirements of NEPA, CEQA, the CAAAs of 1990, and the CCAA of 1988. The analyses also use guidelines and procedures provided in applicable air quality analysis protocols, such as the Transportation Project-Level Carbon Monoxide Protocol (CO Protocol) (Garza et al., 1997), *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{10} and $PM_{2.5}$ Nonattainment and Maintenance Areas* (U.S. EPA, 2015), and the FHWA *Updated Interim Guidance on Air Toxics Analysis in NEPA Documents* (FHWA, 2016).

4.1 Impact Criteria

Project-related emissions will have an adverse environmental impact if they result in pollutant emissions levels that either create or worsen a violation of an ambient air quality standard (identified in Table 2-1) or contribute to an existing air quality violation.

4.2 Short-Term Effects (Construction Emissions)

4.2.1 Construction Equipment, Traffic Congestion, and Fugitive Dust

During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment also are anticipated and would include CO, NO_X, VOCs, directly-emitted PM ($PM_{2.5}$ and PM_{10}), and toxic air contaminants (TACs) (e.g., diesel exhaust PM).

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, and paving roadway surfaces. Construction-related effects on air quality from most roadway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate CO, NO_X, VOCs, PM_{10}, and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after drying. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would also depend on soil moisture, the silt content of soil, wind speed, and the amount of

equipment operating at the time. Larger dust particles would settle near the source, while finer particles would be dispersed over greater distances from the construction site.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, NO_X, VOCs, and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site. Areas within 500 feet of CARB-defined sensitive land uses would be labeled as no-idle areas where material storage/transfer and equipment maintenance activities are not to occur.

SO_2 is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting federal standards can contain up to 5,000 ppm of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur. However, under California law and CARB regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so SO_2-related issues due to diesel exhaust would be minimal.

The construction emissions were estimated for the proposed project using the Sacramento Metropolitan AQMD's Road Construction Emissions Model, Version 9.0, which is consistent with the guidance provided by the SCAQMD for evaluating construction impacts from roadway projects. The maximum amount of construction-related emissions during a peak construction day is presented in Table 4-1 (model data are provided in Appendix C). The PM_{10} and $PM_{2.5}$ emissions assume a 50 percent control of fugitive dust as a result of watering and associated dust-control measures. The emissions presented below are based on the best information available at the time of calculations and specify that the schedule for either of the Build Alternatives is anticipated to take approximately 18 months beginning in 2022. Additionally, SCAQMD has established rules for reducing fugitive dust emissions. With the implementation of standard construction measures (providing 50 percent effectiveness) such as frequent watering (e.g., a minimum of twice per day) as well as Minimization Measures AQ-1 through AQ-6 (see Chapter 5, Minimization Measures), fugitive dust and exhaust emissions from construction activities would not result in any adverse air quality impacts.

Table 4-1. Maximum Project Construction Emissions

Project Phases	VOC	CO	NO_X	Total PM_{10}	Total $PM_{2.5}$
Grubbing/Land Clearing (lbs/day)	1.0	9.8	10.1	10.4	2.5
Grading/Excavation (lbs/day)	5.4	45.2	56.0	12.6	4.4
Drainage/Utilities/Sub-Grade (lbs/day)	5.7	52.1	56.1	12.5	4.4
Paving (lbs/day)	0.9	12.7	8.7	0.5	0.4
Maximum (lbs/day)	5.7	52.1	56.1	12.6	4.4
Total (tons/construction project)	**0.9**	**7.8**	**8.8**	**2.1**	**0.7**

Source: Compiled by LSA (November 2018).
CO = carbon monoxide
lbs/day = pounds per day
NO_X = oxides of nitrogen
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
VOC = volatile organic compounds

Construction activities will not last for more than 3 years at one general location, so construction-related emissions do not need to be included in regional and project-level conformity analysis (40 CFR, Section 93.123(c)(5)).

4.2.2 Asbestos

The proposed project is in Riverside County, which is among the counties listed as containing serpentine and ultramafic rock. However, the portion of Riverside County in which the proposed project lies is not known to contain serpentine or ultramafic rock, according to the California Department of Conservation, Division of Mines and Geology (2000). Therefore, the impact from naturally occurring asbestos during project construction would be minimal to none. In the unlikely event that naturally occurring asbestos, serpentine, or ultramafic rock is discovered, SCAQMD will be notified per Section 93105, Title 17 of the CCR.

4.2.3 Lead

Lead is normally not an air quality issue for transportation projects unless the project involves disturbance of soils containing high levels of aerially deposited lead or painting or modification of structures with lead-based coatings. There are no known soils containing high levels of aerially deposited lead, nor does the proposed project include painting or modification of structures with lead-based coatings. Thus, there is no requirement for an analysis of lead emissions.

4.3 Long-Term Effects (Operational Emissions)

The purpose of the proposed project is to provide increased interchange capacity, reduce congestion, and improve traffic operations, and to improve existing and projected interchange geometric deficiencies.

Based on the traffic analysis *Traffic Study Report* (2019), the proposed project would improve traffic flow without increasing the traffic volumes along the WLC Pkwy or SR-60, as shown in Appendix B. Therefore, the project would have no long term regional vehicle air emission impacts.

4.3.1 CO Analysis

The CO Protocol[9] was developed for project-level conformity (hot-spot) analysis and was approved for use by the U.S. EPA in 1997. It provides qualitative and quantitative screening procedures, as well as quantitative (modeling) analysis methods to assess project-level CO impacts. The qualitative screening step is designed to avoid the use of detailed modeling for projects that clearly cannot

[9] CO Protocol for a CO analysis (www.dot.ca.gov/hq/env/air/pages/coprot.htm)., accessed January 2020.

cause a violation, or worsen an existing violation, of the CO standards. The methodology required for a CO local analysis is summarized in the Caltrans Transportation Project-Level Carbon Monoxide Protocol (CO Protocol), Section 3 (Determination of Project Requirements), and Section 4 (Local Analysis).

Section 3 of the CO Protocol provides two conformity requirement decision flowcharts designed to assist project sponsors in evaluating the requirements that apply to specific projects. Figure 1 of the CO Protocol flowchart (shown in Appendix D of this report) applies to new projects and was used in this local analysis conformity decision. Below is a step-by-step explanation of the flow chart. Each level cited is followed by a response, which in turn determines the next applicable level of the flowchart for the project (Garza et al., 1997).

The flowchart begins with Section 3.1.1.

- **3.1.1. Is this project exempt from all emissions analyses?**

  NO.

  Table 1 of the CO Protocol is Table 2 of 40 CFR, Section 93.126. Section 3.1.1 is inquiring if the project is exempt. Such projects appear in Table 1 of the CO Protocol. The freeway interchange reconstruction and improvement of the Build Alternative is not one of the exempt projects listed in Table 1. Therefore, the proposed project is not exempt from all emissions analyses.

- **3.1.2. Is the project exempt from regional emissions analyses?**

  NO.

  Table 2 of the CO Protocol is Table 3 of 40 CFR, Section 93.127. The question is attempting to determine whether the proposed project is listed in Table 2. Projects that are included in Table 2 of the CO Protocol are exempt from regional conformity. Because the proposed project would reconfigure an interchange for an existing highway, it is not exempt from regional emissions analysis.

- **3.1.3. Is the project locally defined as regionally significant?**

  YES.

  As mentioned above, the proposed project would reconfigure an interchange for an existing highway. Therefore, the proposed project is regionally significant.

- **3.1.4. Is the Project in a Federal Attainment area?**

  NO.

  The proposed project is in an attainment/maintenance area for the federal CO standard; therefore, the proposed project is subject to a regional conformity determination.

- **3.1.5. Is there a currently conforming Regional Transportation Plan [RTP] and transportation improvement program [TIP]?**

  YES.

- **3.1.6. Is the project included in the regional emissions analysis supporting the currently conforming Regional Transportation Plan [RTP] and transportation improvement program [TIP]?**

  YES.

  The proposed project is listed in the 2016 RTP/SCS as amended by Amendment No. 3 adopted on September 6, 2018 under RTP ID RIV080904. The proposed project is listed in the 2019 FTIP under the ID # RIV080904. The FHA and FHWA approved the FTIP on December 17, 2018. Therefore, both of the Build Alternatives meet the CAA requirements and 40 CFR, Section 93.116, without any explicit hot-spot analysis.

- **3.1.7. Has the project design concept and/or scope changed significantly from that in the regional analysis?**

  NO.

  As discussed in Section 3.1.6, regional conformity for the proposed project has been demonstrated for the RTP and the FTIP.

- **3.1.9. Examine local impacts.**

  Section 3.1.9 of the flowchart directs the project evaluation to Section 4 (Local Analysis) of the CO Protocol. This concludes Figure 1.

  Section 4 contains Figure 3 (Local CO Analysis [Appendix D of this report]). This flowchart is used to determine the type of CO analysis required for the Build Alternative. Below is a step-by-step explanation of the flowchart. Each level cited is followed by a response, which in turn determines the next applicable level of the flowchart for the Build Alternative. The flowchart begins at Level 1.

- **Level 1. Is the project in a CO non-attainment area?**

  NO.

  The project site is in an area that has demonstrated attainment with the federal CO standards.

- **Level 1 (cont.). Was the area redesignated as "attainment" after the 1990 Clean Air Act?**

  YES.

- **Level 1 (cont.). Has "continued attainment" been verified with the local Air District, if appropriate?**

  YES.

  The SCAB was designated as attainment/maintenance by the EPA on June 11, 2007. (Proceed to Level 7.)

- **Level 7. Does the project worsen air quality?**

  NO.

  a. *The project significantly increases the percentage of vehicles operating in cold start mode. Increasing the number of vehicles operating in cold start mode by as little as 2% should be considered potentially significant.*

     All vehicles on the freeway and in the intersections are assumed to be in a fully warmed-up mode. Therefore, this criterion is not met.

  b. *The project significantly increases traffic volumes. Increases in traffic volumes in excess of 5% should be considered potentially significant. Increasing the traffic volume by less than 5% may still be potentially significant if there is also a reduction in average speeds.*

     The proposed project would improve traffic flow without increasing the traffic volumes along the WLC Pkwy or SR-60, as shown in Appendix B. Thus, this criterion is not met.

  c. *The project worsens traffic flow. For uninterrupted roadway segments, a reduction in average speeds (within a range of 3 to 50 mph) should be regarded as worsening traffic flow. For intersection segments, a reduction in average speed or an increase in average delay should be considered as worsening traffic flow.*

     As shown in Appendix B, the proposed project would either not change the level of service (LOS) or result in improvement. Thus, this criterion is not met.

The background CO concentrations in the vicinity of the project were 2.4 ppm for 1 hour and 1.8 ppm for 8 hours in 2017. The proposed project is not expected to result in any CO concentrations exceeding the 1-hour or 8 hour CO standards of 20 ppm and 9.0 ppm, respectively. Therefore, a detailed quantitative CO hot-spot analysis is not required and the project has been determined to be satisfactory. No further analysis is needed.

4.3.2 PM Analysis

Emissions Analysis

Based on the traffic analysis (MBI 2019), the proposed project would improve traffic flow without increasing the traffic volumes along the WLC Pkwy or SR-60, as shown in Appendix B. Therefore, the project would have no long term regional vehicle air emission impacts.

Hot-Spot Analysis

In November 2015, the U.S. EPA released an updated version of Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (Guidance) for quantifying the local air quality impacts of transportation projects and comparing them to the PM NAAQS (75 FR 79370). The U.S. EPA originally released the quantitative guidance in December 2010, and released a revised version in November 2013 to reflect the approval of EMFAC 2011 and U.S. EPA's 2012 PM NAAQS final rule. The November 2015 version reflects MOVES2014 and its subsequent minor revisions such as MOVES2014a, to revise design value calculations to be more consistent with other U.S. EPA programs, and to reflect guidance implementation and experience in the field. Note that EMFAC, not MOVES, should be used for project hot-spot analysis in California. The Guidance requires a hot-spot analysis to be completed for a project of air quality concern (POAQC). The final rule in 40 CFR 93.123(b)(1) defines a POAQC as:

(i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;

(ii) Projects affecting intersections that are at Level-of-Service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;

(iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

(iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and

(v) Projects in or affecting locations, areas, or categories of sites which are identified in the $PM_{2.5}$ and PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The U.S. EPA guidance for PM hot-spot analysis and interagency consultation were used to determine whether the project is a POAQC. On October 23, 2018, the Transportation Conformity Working Group (TCWG) determined that the proposed project is not a POAQC. Per the transportation conformity rules and regulations, all nonexempt projects must go through review by the TCWG. The proposed project was approved and concurred upon by interagency consultation at the TCWG meeting as a

project not having adverse impacts on air quality, and the proposed project meets the requirements of the CAA and 40 CFR, Section 93.116. A copy of the TCWG finding is included in Appendix B.

Therefore, both of the Build Alternatives meet the CAA requirements and 40 CFR, Section 93.116, without any explicit hot-spot analysis. The proposed project is listed in the 2016 RTP/SCS as amended by Amendment No. 3 adopted on September 1, 2018 under RTP ID RIV080904. Thus the proposed project is included in the regional emissions analysis that was used to meet regional conformity and would not delay timely attainment of the PM_{10} or $PM_{2.5}$ NAAQS for the SCAB area. On August 1, 2017, the FHWA published its determination that 2016 RTP/SCS Amendment No. 2 conforms with the SIP in accordance with 40 CFR, Part 93. Construction and long-term operation of the proposed project would, therefore, be considered consistent with the purpose of the SIP, and both of the Build Alternatives would conform to the requirements of the federal CAA. The proposed project is listed in the 2019 FTIP under the ID # RIV080904. FHA and FHWA approved the FTIP on December 17, 2018.

4.3.3 NO_2 Analysis

The U.S. EPA modified the NO_2 NAAQS to include a 1-hour standard of 100 parts per billion (ppb) in 2010. Currently there is no federal project-level nitrogen dioxide (NO_2) analysis requirement. However, NO_2 is among the near-road pollutants of concern. Within the project area, it is unlikely that NO_2 standards will be approached or exceeded based on the relatively low ambient concentrations of NO_2 in the South Coast Basin and on the long-term trend toward reduction of NO_X emissions. Because of these factors, a specific analysis of NO_2 was not conducted for the proposed project.

4.3.4 Mobile Source Air Toxics Analysis

FHWA released updated guidance in October 2016 (FHWA, 2016) for determining when and how to address MSAT impacts in the NEPA process for transportation projects. FHWA identified three levels of analysis:

- No analysis for exempt projects or projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; and
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Projects with no impacts generally include those that a) qualify as a categorical exclusion under 23 CFR 771.117, b) qualify as exempt under the FCAA conformity rule under 40 CFR 93.126, and c) are not exempt, but have no meaningful impacts on traffic volumes or vehicle mix.

Projects that have low potential MSAT effects are those that serve to improve highway, transit, or freight operations or movement without adding substantial new capacity or creating a facility that is likely to substantially increase emissions. The large majority of projects fall into this category.

Projects with high potential MSAT effects include those that:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of Diesel Particulate Matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year; and
- Are proposed to be located in proximity to populated areas or, in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

As shown in Table 1-1, the existing traffic on SR-60 near the proposed project is well below the criteria of 125,000 average daily trips or 10,000 truck trips. While future truck volumes are expected to be much higher than the existing levels because of the extensive number of planned intermodal warehouses in this area, auto and truck volumes on SR-60 or adjacent streets would not substantially change as a result of the proposed project. Consequently, the emission effects of the proposed project would be low, and it is expected that there would be no appreciable difference in overall MSAT emissions between the No Build and Build alternatives. Because the emission effects of the proposed project would be low, it is expected that there would be no appreciable difference in overall MSAT emissions between the No Build and Build alternatives.

4.3.5 Climate Change / Greenhouse Gas Emissions Analysis

GHG emissions from transportation projects can be divided into those produced during operation of the project and those produced during construction. The primary GHGs produced by the transportation sector are CO_2, CH_4, N_2O, and HFCs. CO_2 emissions are a product of the combustion of petroleum-based products, like gasoline, in internal combustion engines. Relatively small amounts of CH_4 and N_2O are emitted during fuel combustion. In addition, a small amount of HFC emissions are included in the transportation sector.

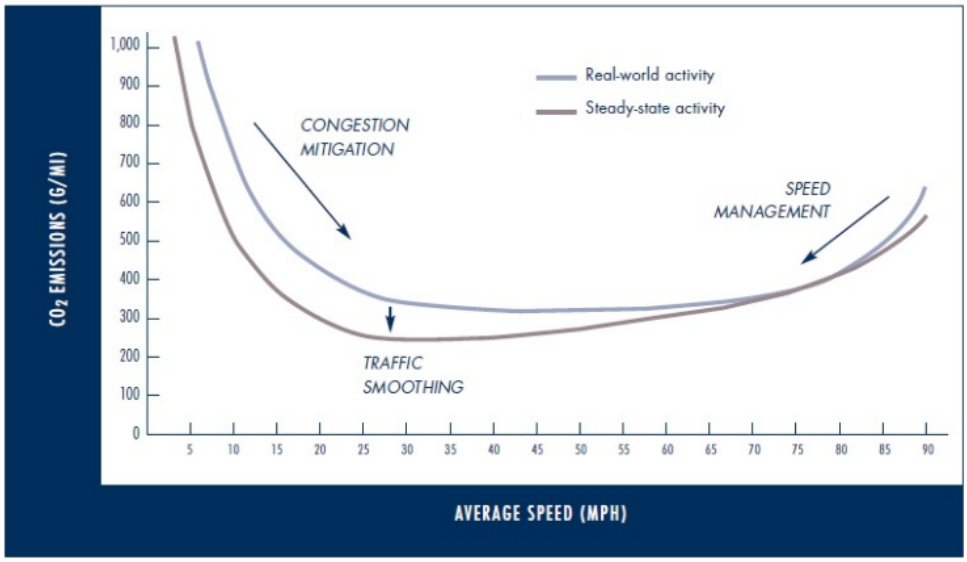
The CEQA Guidelines generally address greenhouse gas emissions as a cumulative impact due to the global nature of climate change (Pub. Resources Code, § 21083(b)(2)). As the California Supreme Court explained, “because of the global scale of climate change, any one project's contribution is unlikely to be significant by itself.” (Cleveland National Forest Foundation *v.* San Diego Assn. of Governments (2017) 3 Cal.5th 497, 512.) In assessing cumulative impacts, it must be determined if a project’s incremental effect is “cumulatively considerable” (CEQA Guidelines Sections 15064(h)(1) and 15130)).

To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. Although climate change is ultimately a cumulative impact, not every individual project that emits greenhouse gases must necessarily be found to contribute to a significant cumulative impact on the environment.

Operational Emissions

CO_2 accounts for 95 percent of transportation GHG emissions in the U.S. The largest sources of transportation-related GHG emissions are passenger cars and light-duty trucks, including sport utility vehicles, pickup trucks, and minivans. These sources account for over half of the emissions from the sector. The remainder of GHG emissions comes from other modes of transportation, including freight trucks, commercial aircraft, ships, boats, and trains, as well as pipelines and lubricants. Because CO_2 emissions represent the greatest percentage of GHG emissions it has been selected as a proxy within the following analysis for potential climate change impacts generally expected to occur.
The highest levels of CO_2 from mobile sources such as automobiles occur at stop-and-go speeds (0–25 miles per hour) and speeds over 55 miles per hour; the most severe emissions occur from 0–25 miles per hour (see Figure 4-1). To the extent that a project relieves congestion by enhancing operations and improving travel times in high-congestion travel corridors, GHG emissions, particularly CO_2, may be reduced.

Four primary strategies can reduce GHG emissions from transportation sources: (1) improving the transportation system and operational efficiencies, (2) reducing travel activity, (3) transitioning to lower GHG-emitting fuels, and (4) improving vehicle technologies/efficiency. To be most effective, all four strategies should be pursued concurrently.



Source: Barth and Boriboonsomsin 2010

Figure 4-1. Possible Use of Traffic Operation Strategies in Reducing On-Road CO_2 Emissions

The proposed project is listed in the 2016 RTP/SCS as amended by Amendment No. 3 adopted on September 6, 2018 under RTP ID 3M0801-RIV080904. The proposed project is listed in the 2019 FTIP under the ID # RIV080904. The 2019 FTIP was approved by SCAG on September 1, 2018 and by FTA

and FHWA on December 17, 2018. The design concept and scope of the proposed project is consistent with the project description in the 2016 RTP/SCS and 2019 FTIP and the "open to traffic" assumptions of the SCAG's regional emissions analysis.

The purpose of the proposed project is to provide increased interchange capacity, reduce congestion, improve traffic operations, and improve existing and projected interchange geometric deficiencies. Based on the *Traffic Study Report* (January 2019), the proposed project would improve traffic flow without increasing the traffic volumes along the WLC Pkwy or SR-60.

Quantitative Analysis

Traffic data, including VMT, intersection queuing and delay times, and average roadway speeds for the existing/baseline condition, opening year, and 2045 were combined with GHG emissions factors from the EMFAC2017 model to produce the GHG emissions rates shown in Table 4-2 (EMFAC2017 worksheets are provided in Appendix E). The horizon year of 2045 was used for the World Logistics Center traffic analysis to be consistent with the SCAG 2016 RTP/SCS, which includes all foreseeable development projects in the greater Moreno Valley area.

There would be no measurable differences in VMT for the Design Variations.

Table 4-2 Modeled Annual CO_2 Emissions and Vehicle Miles Traveled, by Alternative

Alternative	CO_2e Emissions (Metric Tons/Year)	Annual Vehicle Miles Traveled[1]
Existing/Baseline 2018	10,577	24,575,948
Open to Traffic 2025		
No Build	18,708	37,010,238
Build Alternative 2	16,237	
Build Alternative 6	16,072	
20-Year Horizon/Design-Year 2045		
No Build	26,486	67,306,279
Build Alternative 2	23,936	
Build Alternative 6	22,758	

Sources: *Traffic Study Report* (January 2019), *Average Speed Data for Air Quality Analysis Technical Memorandum* (October 2019) and EMFAC2017.

[1] Annual vehicle miles traveled (VMT) values derived from Daily VMT values multiplied by 347, per CARB methodology (CARB 2008).

CO_2e = carbon dioxide equivalent (CO_2, CH_4, and N_2O)

Based on the *Traffic Study Report* (January 2019), the proposed project would improve traffic flow without increasing the traffic volumes along WLC Pkwy or SR-60, thus the No Build and both Build Alternative VMT amounts are the same. The VMT increases from 2018 to 2025 due to the increased regional vehicle traffic from all known development projects in the greater Moreno Valley area that will foreseeably be completed by 2025. The VMT increases 2018 to 2045 due to the increased regional vehicle traffic from all known development projects in the greater Moreno Valley area that will foreseeably be completed by 2045. As shown in Table 4-2, the Alternative 2 configuration would

reduce GHG emissions in both the opening and horizon years compared to the corresponding No-Build Alternative. Also shown in Table 4-2, the roundabouts in Alternative 6 would further reduce emissions compared to Alternative 2.

While EMFAC has a rigorous scientific foundation and has been vetted through multiple stakeholder reviews, its GHG emission rates are based on tailpipe emission test data. Moreover, the model does not account for factors such as the rate of acceleration and vehicle aerodynamics, which influence the amount of emissions generated by a vehicle. GHG emissions quantified using EMFAC are therefore estimates and may not reflect actual physical emissions. Though EMFAC is currently the best available tool for calculating GHG emissions from mobile sources, it is important to note that the GHG results are only useful for a comparison among alternatives.

Construction Emissions

Construction GHG emissions would result from material processing, on-site construction equipment, and traffic delays due to construction. These emissions will be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases.

In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be offset to some degree by longer intervals between maintenance and rehabilitation activities.

The Sacramento Metropolitan Air Quality Management District Road Construction Emissions Model, Version 9.0 was used to quantify the expected construction-related GHG emissions related to the proposed project. Construction of the project would emit a daily maximum of up to 13,009 pounds per day of CO_2e and a total quantity of 1,718 tons of CO_2e, as shown in Table 4.3. Construction is expected to last 18 months, resulting in maximum yearly emissions of 1,301 tons/year of CO_2e.

Table 4.3 Maximum Project Construction Emissions

Project Phases	CO_2	CH_4	N_2O	CO_2e
Grubbing/Land Clearing (lbs/day)	2,109	1	<1	2,137
Grading/Excavation (lbs/day)	12,755	3	1	13,009
Drainage/Utilities/Sub-Grade (lbs/day)	10,473	3	<1	10,578
Paving (lbs/day)	2,134	1	<1	2,162
Maximum (lbs/day)	12,755	3	1	13,009
Project Total (tons/construction project)	**1,864**	**<1**	<1	**1,718**[1]
2022 Annual Total (tons/yr)	1,413	<1	<1	1,305[1]
2023 Annual Total (tons/yr)	451	<1	<1	413[1]

Source: Compiled by LSA (November 2018)..

[1] The annual and project total CO_2e emissions are reported as metric tons

CO_2 = carbon dioxide
N_2O = nitrous oxide
lbs/day = pounds per day
CO_2e = carbon dioxide equivalent
CH_4 = methane
tons/yr = tons per year

The Project Features discussed in Section 5.2.1 will also be implemented as part of the project to reduce GHG emissions and potential climate change impacts from the project.

All construction contracts include Caltrans Standard Specifications Section 7-1.02A and 7-1.02C, Emissions Reduction, which require contractors to comply with all laws applicable to the project and to certify they are aware of and will comply with all CARB emission reduction regulations; and Section 14-9.02, Air Pollution Control, which requires contractors to comply with all air pollution control rules, regulations, ordinances, and statutes. Certain common regulations, such as equipment idling restrictions, that reduce construction vehicle emissions also help reduce GHG emissions.

4.3.6 CEQA Conclusion

GHG emissions increase in future years compared to existing conditions, with or without the project, due to anticipated regional growth. Even though the project would not increase VMT, the Alternative 2 configuration would reduce GHG emissions in both the opening and horizon years compared to the corresponding No-Build Alternative and the roundabouts in Alternative 6 would further reduce emissions compared to Alternative 2. The project would improve traffic operations and reduce GHG emissions compared to the No-Build condition, but because it would not reduce GHG emissions from the existing condition, it would not contribute to achieving statewide GHG emissions reduction goals. The impact would be significant.

The proposed project would not conflict with any plan, policy, or regulation for the reduction of GHGs. This impact would be less than significant.

Project operational features such as bicycle and pedestrian improvements and construction GHG-reduction measures would reduce the impact, but not to a less-than-significant level. Accordingly, the overall impact on GHGs would be significant.

Caltrans is firmly committed to implementing measures to help reduce GHG emissions. These measures are outlined in Section 5.2.1.

4.4 Cumulative/Regional/Indirect Effects

O_3, secondary PM_{10}, and secondary $PM_{2.5}$ are normally regional issues because they are formed by photochemical and chemical reactions over time in the atmosphere. For these pollutants, localized impact analysis is not meaningful. As described above, based on the traffic analysis (MBI 2018), the proposed project would improve traffic flow without increasing the traffic volumes along the WLC Pkwy or SR-60. Thus, the proposed Project would not result in increases in the emissions of O_3, secondary PM_{10}, or secondary $PM_{2.5}$.

The proposed project is listed in the 2016 RTP/SCS as amended by Amendment No. 3 under RTP ID 3M0801-RIV080904, which includes a regional emissions analysis for ozone and PM. As described in

the Program Environmental Impact Report for the 2016 RTP/SCS, "The 2016 RTP/SCS meets the regional emissions and other tests set forth by the federal Transportation Conformity regulations, demonstrating the integrity of the State Implementation Plans prepared pursuant to the federal Clean Air Act for the non-attainment and maintenance areas in the SCAG region." Further, it concludes: "Despite temporary significant construction emissions, long term criteria pollutant emissions by the County is expected to decline with implementation of the Plan." Thus, as the proposed project is included in the 2016 RTP/SCS, it would also not result in a significant cumulative regional air quality effect.

5. Minimization Measures

CEQA requires that feasible measures that can eliminate or substantially reduce project impacts be addressed. The FHWA requires a project to incorporate measures to mitigate adverse impacts caused by the action and requires the project applicant to be responsible for the implementation of the measures (23 CFR 771).

5.1 Short-Term (Construction)

The following measures will be implemented during construction activities.

AQ-1 During clearing, grading, earthmoving, or excavation operations, excessive fugitive dust emissions will be controlled by regular watering or other dust preventive measures using the following procedures, as specified in the South Coast Air Quality Management District (SCAQMD) Rule 403. All material excavated or graded will be sufficiently watered to prevent excessive amounts of dust. Watering will occur at least twice daily with complete coverage, preferably in the late morning and after work is done for the day. All material transported on site or off site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust. The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized to prevent excessive amounts of dust. These control techniques will be indicated in project specifications. Visible dust beyond the property line emanating from the project will be prevented to the maximum extent feasible.

AQ-2 Project specifications will include the duration of construction. Ozone precursor emissions from construction equipment vehicles will be controlled by maintaining equipment engines in good condition and in proper tune per manufacturers' specifications.

AQ-3 All trucks that are to haul excavated or graded material on site will comply with State Vehicle Code Section 23114, with special attention to Sections 23114(b)(F), (e)(2), and (e)(4), as amended, regarding the prevention of such material spilling onto public streets and roads.

AQ-4 The contractor will adhere to the California Department of Transportation (Caltrans) Standard Specifications for Construction, Sections 14.9-02 and 14-9.03.

AQ-5 Should the Project geologist determine that asbestos-containing materials (ACMs) are present at the Project study area during final inspection prior to construction, the appropriate methods will be implemented to remove ACMs.

AQ-6 All construction vehicles both on and off site shall be prohibited from idling in excess of 5 minutes.

5.2 Long-Term (Operational)

No avoidance, minimization, and/or mitigation measures are required, as the project would not produce substantial operational air quality impacts.

5.2.1 Greenhouse Gas Reduction Strategies

Statewide Efforts

Major sectors of the California economy, including transportation, will need to reduce emissions to meet the 2030 and 2050 GHG emissions targets. Former Governor Edmund G. Brown promoted GHG reduction goals (Figure 5-1) that involved (1) reducing today's petroleum use in cars and trucks by up to 50 percent; (2) increasing from one-third to 50 percent our electricity derived from renewable sources; (3) doubling the energy efficiency savings achieved at existing buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farms and rangelands, forests, and wetlands so they can store carbon; and (6) periodically updating the state's climate adaptation strategy, *Safeguarding California* (see Figure 5-1).

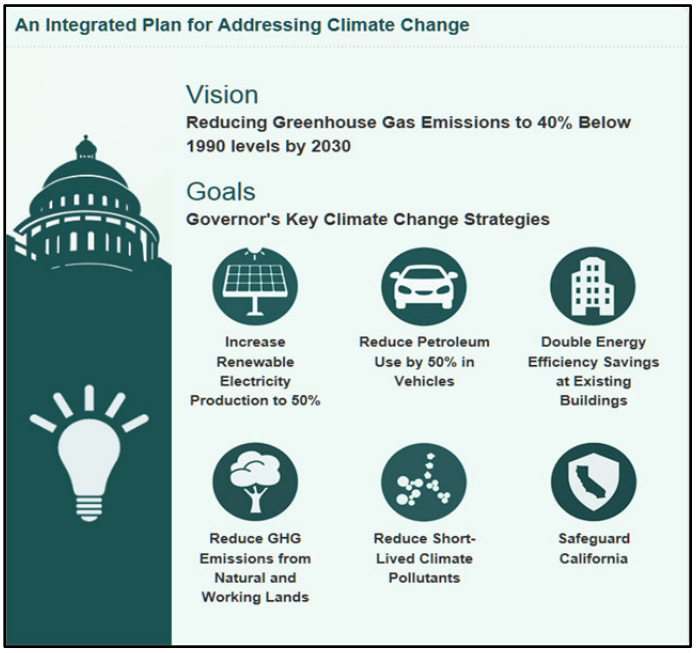


Figure 5-1. California Climate Strategy

The transportation sector is integral to the people and economy of California. To achieve GHG emission reduction goals, it is vital that the state build on past successes in reducing criteria and toxic air pollutants from transportation and goods movement. GHG emission reductions will come from cleaner vehicle technologies, lower-carbon fuels, and reduction of vehicle miles traveled (VMT). A key state goal for reducing greenhouse gas emissions is to reduce today's petroleum use in cars and trucks by up to 50 percent by 2030 (State of California 2019).

In addition, SB 1386 (Wolk 2016) established as state policy the protection and management of natural and working lands and requires state agencies to consider that policy in their own decision making. Trees and vegetation on forests, rangelands, farms, and wetlands remove carbon dioxide from the atmosphere through biological processes and sequester the carbon in above- and below-ground matter.

Caltrans Activities

Caltrans continues to be involved on the Governor's Climate Action Team as the CARB works to implement EOs S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. EO B-30-15, issued in April 2015, and SB 32 (2016), set an interim target to cut GHG emissions to 40 percent below 1990 levels by 2030. The following major initiatives are underway at Caltrans to help meet these targets.

California Transportation Plan (CTP 2040)

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. In 2016, Caltrans completed the *California Transportation Plan 2040*, which establishes a new model for developing ground transportation systems, consistent with CO_2 reduction goals. It serves as an umbrella document for all the other statewide transportation planning documents. Over the next 25 years, California will be working to improve transit and reduce long-run repair and maintenance costs of roadways and developing a comprehensive assessment of climate-related transportation demand management and new technologies rather than continuing to expand capacity on existing roadways.

SB 391 (Liu 2009) requires the CTP to meet California's climate change goals under AB 32. Accordingly, the CTP 2040 identifies the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the state's transportation needs. While MPOs have primary responsibility for identifying land use patterns to help reduce GHG emissions, CTP 2040 identifies additional strategies in Pricing, Transportation Alternatives, Mode Shift, and Operational Efficiency.

Caltrans Strategic Management Plan

The Strategic Management Plan, released in 2015, creates a performance-based framework to preserve the environment and reduce GHG emissions, among other goals. Specific performance targets in the plan that will help to reduce GHG emissions include:

- Increasing percentage of non-auto mode share
- Reducing VMT
- Reducing Caltrans' internal operational (buildings, facilities, and fuel) GHG emissions

Funding and Technical Assistance Programs

In addition to developing plans and performance targets to reduce GHG emissions, Caltrans also administers several sustainable transportation planning grants. These grants encourage local and regional multimodal transportation, housing, and land use planning that furthers the region's RTP/SCS; contribute to the State's GHG reduction targets and advance transportation-related GHG emission reduction project types/strategies; and support other climate adaptation goals (e.g., *Safeguarding California*).

Caltrans Policy Directives and Other Initiatives

Caltrans Director's Policy 30 (DP-30) Climate Change (June 22, 2012) is intended to establish a Department policy that will ensure coordinated efforts to incorporate climate change into Departmental decisions and activities. *Caltrans Activities to Address Climate Change* (April 2013) provides a comprehensive overview of Caltrans' statewide activities to reduce GHG emissions resulting from agency operations.

Project-Level GHG Reduction Strategies

The following Project Features will be implemented as part of the project to reduce GHG emissions and potential climate change impacts resulting from the project:

PF-AQ-2 Project specifications will include the duration of construction. Ozone precursor emissions from construction equipment vehicles will be controlled by maintaining equipment engines in good condition and in proper tune per manufacturers' specifications.

PF-AQ-6 All construction vehicles both on and off site shall be prohibited from idling in excess of 5 minutes.

Additionally, the following GHG-specific Project Features will be implemented as part of the project construction:

PF-GHG-1 Right size equipment for the job.

PF-GHG-2 Use equipment with new technologies to the maximum extent practical within the currently accepted practice.

PF-GHG-3 Maximize use of recycled materials (e.g., tire rubber).

PF-GHG-4 Reduce need for electric lighting by using ultra-reflective sign materials that are illuminated by headlights.

PF-GHG-5 Develop a traffic plan to minimize traffic flow interference from construction activities.

The following operational GHG-specific Project Features will be implemented as part of the project:

PF-GHG-6 Include landscaping components such as mulch and compost application to improve carbon sequestration rates in soils and reduce organic waste.

PF-GHG-7 Design and install long-life pavement structures to minimize life-cycle costs.

PF-GHG-8 Design medians to comply with City landscape standards to increase water efficiency with efficient irrigation, grading that retains water run-off, and a drought tolerant plant palette.

PF-GHG-9 Use rubberized asphalt concrete to the maximum extent practical within currently accepted practice.

PF-GHG-10 Implement low impact development practices to the maximum extent practical within currently accepted practice that maintain existing site hydrology to manage storm water and protect the environment.

PF-GHG-11 Use lighting systems that are energy efficient, such as LED technology.

PF-GHG-12 Incorporate bicycle and pedestrian facilities into project design.

5.2.2 Adaptation

Reducing GHG emissions is only one part of an approach to addressing climate change. Caltrans must plan for the effects of climate change on the state's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and their intensity, and in the frequency and intensity of wildfires. Flooding and erosion can damage or wash out roads; longer periods of intense heat can buckle pavement and railroad tracks; storm surges combined with a rising sea level can inundate highways. Wildfire can directly burn facilities and indirectly cause damage when rain falls on denuded slopes that landslide after a fire. Effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. Accordingly, Caltrans must consider these types of climate stressors in how highways are planned, designed, built, operated, and maintained.

Federal Efforts

Under NEPA assignment, Caltrans is obligated to comply with all applicable federal environmental laws and FHWA NEPA regulations, policies, and guidance.

The U.S. Global Change Research Program (USGCRP) delivers a report to Congress and the president every 4 years, in accordance with the Global Change Research Act of 1990 (15 U.S.C. ch. 56A § 2921 et seq). The *Fourth National Climate Assessment*, published in 2018, presents the foundational science and the "human welfare, societal, and environmental elements of climate change and variability for 10 regions and 18 national topics, with particular attention paid to observed and projected risks, impacts, consideration of risk reduction, and implications under different mitigation pathways." Chapter 12, "Transportation," presents a key discussion of vulnerability assessments. It notes that "asset owners and operators have increasingly conducted more focused studies of particular assets that consider multiple climate hazards and scenarios in the context of asset-specific information, such as design lifetime" (USGCRP 2018).

U.S. DOT Policy Statement on Climate Adaptation in June 2011 committed the federal Department of Transportation to "integrate consideration of climate change impacts and adaptation into the planning, operations, policies, and programs of DOT in order to ensure that taxpayer resources are invested wisely, and that transportation infrastructure, services and operations remain effective in current and future climate conditions" (U.S. DOT 2011).

FHWA order 5520 (*Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events,* December 15, 2014) established FHWA policy to strive to identify the risks of climate change and extreme weather events to current and planned transportation systems. FHWA has developed guidance and tools for transportation planning that foster resilience to climate effects and sustainability at the federal, state, and local levels (FHWA 2019).

State Efforts

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system. *California's Fourth Climate Change Assessment* (2018) is the state's effort to "translate the state of climate science into useful information for action" in a variety of sectors at both statewide and local scales. It adopts the following key terms used widely in climate change analysis and policy documents:

- *Adaptation* to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
- *Adaptive capacity* is the "combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities."
- *Exposure* is the presence of people, infrastructure, natural systems, and economic, cultural, and social resources in areas that are subject to harm.
- Resilience is the "capacity of any entity – an individual, a community, an organization, or a natural system – to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience". Adaptation actions contribute to increasing resilience, which is a desired outcome or state of being.

- *Sensitivity* is the level to which a species, natural system, or community, government, etc., would be affected by changing climate conditions.
- *Vulnerability* is the "susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt." Vulnerability can increase because of physical (built and environmental), social, political, and/or economic factor(s). These factors include, but are not limited to: ethnicity, class, sexual orientation and identification, national origin, and income inequality.2 Vulnerability is often defined as the combination of sensitivity and adaptive capacity as affected by the level of exposure to changing climate.

Several key state policies have guided climate change adaptation efforts to date. Recent state publications produced in response to these policies draw on these definitions.

EO S-13-08, issued by then-governor Arnold Schwarzenegger in November 2008, focused on sea-level rise and resulted in the *California Climate Adaptation Strategy* (2009), updated in 2014 as *Safeguarding California: Reducing Climate Risk* (Safeguarding California Plan). The Safeguarding California Plan offers policy principles and recommendations and continues to be revised and augmented with sector-specific adaptation strategies, ongoing actions, and next steps for agencies.

EO S-13-08 also led to the publication of a series of sea-level rise assessment reports and associated guidance and policies. These reports formed the foundation of an interim *State of California Sea-Level Rise Interim Guidance Document* (SLR Guidance) in 2010, with instructions for how state agencies could incorporate "sea-level rise (SLR) projections into planning and decision making for projects in California" in a consistent way across agencies. The guidance was revised and augmented in 2013. *Rising Seas in California – An Update on Sea-Level Rise Science* was published in 2017 and its updated projections of sea-level rise and new understanding of processes and potential impacts in California were incorporated into the *State of California Sea-Level Rise Guidance Update* in 2018.

EO B-30-15, signed in April 2015, requires state agencies to factor climate change into all planning and investment decisions. This EO recognizes that effects of climate change other than sea-level rise also threaten California's infrastructure. At the direction of EO B-30-15, the Office of Planning and Research published *Planning and Investing for a Resilient California: A Guidebook for State Agencies* in 2017, to encourage a uniform and systematic approach. Representatives of Caltrans participated in the multi-agency, multidisciplinary technical advisory group that developed this guidance on how to integrate climate change into planning and investment.

AB 2800 (Quirk 2016) created the multidisciplinary Climate-Safe Infrastructure Working Group, which in 2018 released its report, *Paying it Forward: The Path Toward Climate-Safe Infrastructure in California*. The report provides guidance to agencies on how to address the challenges of assessing risk in the face of inherent uncertainties still posed by the best available science on climate change. It also examines how state agencies can use infrastructure planning, design, and implementation processes to address the observed and anticipated climate change impacts.

Caltrans Adaptation Efforts

Caltrans Vulnerability Assessments

Caltrans is conducting climate change vulnerability assessments to identify segments of the State Highway System vulnerable to climate change effects including precipitation, temperature, wildfire, storm surge, and sea-level rise. The approach to the vulnerability assessments was tailored to the practices of a transportation agency, and involves the following concepts and actions:

- *Exposure* – Identify Caltrans assets exposed to damage or reduced service life from expected future conditions.
- *Consequence* – Determine what might occur to system assets in terms of loss of use or costs of repair.
- *Prioritization* – Develop a method for making capital programming decisions to address identified risks, including considerations of system use and/or timing of expected exposure.

The climate change data in the assessments were developed in coordination with climate change scientists and experts at federal, state, and regional organizations at the forefront of climate science. The findings of the vulnerability assessments will guide analysis of at-risk assets and development of adaptation plans to reduce the likelihood of damage to the State Highway System, allowing Caltrans to both reduce the costs of storm damage and to provide and maintain transportation that meets the needs of all Californians.

Project Adaptation Analysis

The proposed project is outside the coastal zone and not in an area subject to sea-level rise. Accordingly, direct impacts to transportation facilities due to projected sea-level rise are not expected.

Projects in Floodplains

The project area is not located within a FEMA-designated 100-year floodplain, while DWR Awareness mapping indicates an Awareness floodplain located in the project area, mostly within Moreno Valley. DWR designates Awareness floodplains as 100-year flood hazard areas. Hydraulic modeling for the proposed project, however, determined that the boundaries of the Awareness Floodplain do not accurately represent the actual boundaries of the base flood. The flow patterns within the area north of SR-60 do not flood the entire area as the Awareness Floodplain boundary implies. The portion of the project area within an Awareness Floodplain regulated by RCFCWCD does not contain any large canyon outfalls and appears to be largely free of flooding during a 100-year flood event [*Water Quality Assessment Report (January 2019)*].

The Caltrans Draft District 8 Climate Vulnerability Assessment indicates the project area would be subject to a less than 5 percent increase in storm precipitation depth through 2085 (Caltrans 2018). This report notes that many of the streams and alluvial fans within the Awareness Floodplain

boundary are not tributary to the SR-60/WLC Pkwy interchange, and actually flow away from the project area. Hydraulics analysis found that no flooding occurs around the SR-60/WLC Pkwy interchange under the existing or proposed conditions, including the area within RCFCWCD jurisdiction.

Project construction would comply with all City and County permit grading requirements. The minor grading required within the Awareness floodplain would not modify the flood flows. A channel would be constructed in the Awareness Floodplain along the edge of the roadway embankment that would confine the base flood in the northwestern quadrant of the SR-60/WLC Pkwy interchange. Operationally, the Build Alternatives and Design Variations 2a and 6a would not change flood patterns or increase flood depths. Project implementation would not substantially alter the overall drainage pattern in the project area; rather, the project would improve the existing drainage patterns by improving the distribution of storm water flow to the storm drain system. As described in the *Water Quality Assessment Report* (January 2019)Treatment Best Management Practices (BMPs), including infiltration basins and biofiltration swales, would be incorporated into the design of the Build Alternatives in accordance with the requirements of the Caltrans MS4 Permit and the Riverside County MS4 Permit. The infiltration basins and biofiltration swales would promote infiltration to offset any increased flows associated with the increase in impervious surface from the project area and would provide flow duration, volume, and rate control functions. Given these requirements and design features and the relatively small climate-change related increases in precipitation anticipated through 2085, it is expected that the project design adequately addresses potential future climate effects related to precipitation.

Wildfire

The project location is adjacent to an LRA Very High Fire Hazard Severity Zone, and near an SRA Moderate Fire Hazard Severity Zone.[10] The project site is about 1 mile from the foothills, and is developed with a series of existing highway facilities and access roads, with sparse vegetation. The project would not expose people or property to new increased wildland fire risks.

6. Conclusions

As described above, the purpose of the proposed project is to provide increased interchange capacity, reduce congestion, and improve traffic operations, and to improve existing and projected interchange geometric deficiencies. As shown in Section 4, Environmental Consequences, neither the short-term construction impacts nor the long-term operational impacts would result in any air quality impacts.

However, the project would result in a significant climate change (greenhouse gas emissions) CEQA impact.

[10] CalFire Fire Hazard Severity Zones Maps. Website: osfm.fire.ca.gov/media/6752/fhszs_map60.pdf, accessed January 2020.

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8. Appendices

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Appendix A

2016 RTP/SCS & 2019 FTIP

Project Listings

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TABLE 2 Financially-Constrained RTP/SCS Projects - Continued

System	Lead Agency	RTP ID	Route #	Route Name	From	To	Description	Completion Year	Project Cost ($1,000's)
County: Riverside									
STATE HIGHWAY	MORENO VALLEY	3M0801-RIV080904	60	THEODORE ST	AT SR-60		AT SR-60/THEODORE ST IC: WIDEN OC FROM 2 TO 4/6 THRU LNS; WIDEN WB EXIT/ENTRY RAMPS FROM 1-2 LNS AT EXIT/ENTRY, 3 LNS AT ART. W/ HOV AT ENTRY; WIDEN EB EXIT RAMP FROM 1-2 LNS AT EXIT AND 3 LNS AT ART.; WIDEN EB ENTRY RAMP FROM 1-2 LNS W/HOV; ADD EB LOOP ENTRY WITH 2 LNS AT ART AND 1 LN AT ENTRY; ADD AUX LNS 1400' EB DIR E/O IC, 2,500' EB DIR W/O IC, 2,300' WB DIR W/O IC & 1,700' WB DIR E/O IC (EA	2020	$96,613
STATE HIGHWAY	MORENO VALLEY	RIV041052-RIV041052	60	MORENO BEACH DR	NORTH RAMPS	EUCALYPTUS AVE	IN MORENO VALLEY AT SR-60/MORENO BEACH DR IC: MODIFY MORENO BEACH DR IC - WIDEN OC FROM 2 TO 6 THROUGH LANES, REALIGN/WIDEN RAMPS (WB EXIT 1 TO 2 LANES), ADD NEW WB ENTRY RAMP (2 LANES), ADD WB AUX LANE, AND INSTALL RELATED DRAINAGE AND ASSOCIATED WORK (EA: 32303).	2020	$40,700
STATE HIGHWAY	RIVERSIDE, CITY OF	3M04WT018	60	SR-60 (PM 11.23 TO 12.23)	AT MAIN ST	BTWN RUSSELL ST & STODDARD AVE	RECONSTRUCT/WIDEN IC AND RECONSTRUCT/WIDEN RAMPS, CHANNELIZATION IMPROVEMENTS	2025	$20,304
STATE HIGHWAY	RIVERSIDE COUNTY TRANSPORTATION COMMISSION (RCTC)	3M01MA09	71	SR-71	SR-91	SAN BERNARDINO COUNTY LINE	WIDEN TO 3 MF LANES EACH DIRECTION	2035	$177,132
STATE HIGHWAY	HEMET	3160006	74	SR-74	PM 36.928	PM 37.955	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF HEMET - SR74/FLORIDA AVENUE WIDENING FROM 4 TO 6 LANES (3 IN EACH DIRECTION) FROM WARREN RD. TO CAWSTON AVE.	2019	$5,000
STATE HIGHWAY	HEMET	3160007	74	SR-74	PM 37.955	PM 42.088	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF HEMET - SR74/FLORIDA AVENUE WIDENING FROM 4 TO 6 LANES (3 IN EACH DIRECTION) FROM CAWSTON AVE. TO COLUMBIA ST.	2023	$5,000
STATE HIGHWAY	HEMET	3160008	74	SR-74	PM 42.088	EAST OF PM 43.853	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF HEMET - SR74/FLORIDA AVENUE WIDENING FROM 4 TO 6 LANES (3 IN EACH DIRECTION) FROM COLUMBIA ST. TO RAMONA EXP.	2024	$7,620
STATE HIGHWAY	HEMET	3A04WT037	74	SR-74 (PM 34.548 TO PM 36.928)	WINCHESTER RD (SR-79)	WARREN RD	WIDEN FROM 4 TO 6 LANES	2025	$15,228

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Riverside County Project Listing
State Highway
(in $000`s)

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	Signage Begin	Signage End	System	Conformity Category	Amendment
RIV071242	Riverside	SCAB		3A07045	CAX60	60	15.9	15.9			S	NON-EXEMPT	0
Description:							PTC	14,120			Agency	MORENO VALLEY	

IN THE CITY OF MORENO VALLEY - RECONSTRUCT INDIAN ST X-ING SR 60 FROM 150' S/O SUNNYMEAD BLVD., TO HEMLOCK AVE: COMPLETE RECONSTRUCT. OF THE BRIDGE TO PROVIDE 16'6" CLEARANCE & 4 THROUGH LANES (2 LNS IN EA DIR) & ASSOC. ST IMP. WITHIN THE PROJECT LIMITS (LEFT TURN POCKETS AT SUNNYMEAD AND HEMLOCK INTERSECT., RIGHT-TURN ONLY SB AT SUNNYMEAD, NEW TS AT HEMLOCK/INDIAN ST., & INTERCONNECT MOD).

Fund	ENG	R/W	CON	Total	Prior	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
CITY FUNDS	1,350	770	12,000	14,120				2,120		12,000		14,120
RIV071242 Total	1,350	770	12,000	14,120				2,120		12,000		14,120

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	Signage Begin	Signage End	System	Conformity Category	Amendment
RIV080902	Riverside	SCAB		3M0712	CAXT3	60	19	21			S	NON-REPORTABLE TCM	0
Description:							PTC	52,000			Agency	MORENO VALLEY	

AT SR-60/REDLANDS BLVD - WIDEN OC FROM 2 TO 6 THRU LANES; WIDEN WB EXIT & ENTRY RAMPS FROM 1 LANE TO 2 LANES AT EXIT/ENTRY, 3 LANES AT ARTERIAL AND HOV AT ENTRY; WIDEN EB EXIT & ENTRY RAMPS FROM 1 LANE TO 2 LANES AT EXIT/ENTRY AND HOV AT ENTRY; ADD AUX LANES 1000' EACH DIRECTION WEST OF IC AND 1700' EACH DIRECTION EAST OF IC

Fund	ENG	R/W	CON	Total	Prior	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
DEVELOPER FEES	7,000	11,000	34,000	52,000				7,000	11,000		34,000	52,000
RIV080902 Total	7,000	11,000	34,000	52,000				7,000	11,000		34,000	52,000

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	Signage Begin	Signage End	System	Conformity Category	Amendment
RIV080904	Riverside	SCAB		3M0801	CAXT3	60	20	22			S	NON-REPORTABLE TCM	0
Description:							PTC	96,613			Agency	MORENO VALLEY	

AT SR-60/THEODORE ST IC: WIDEN OC FRM 2 TO 4/6 THRU LNS; WIDEN WB EXIT/ENTRY RAMPS FRM 1-2 LNS AT EXIT/ENTRY, 3 LNS AT ART. W/ HOV AT ENTRY; WIDEN EB EXIT RAMP FRM 1-2 LNS AT EXIT & 3 LNS AT ART.; WIDEN EB ENTRY RAMP FROM 1-2 LNS W/HOV; ADD EB LOOP ENTRY WITH 2 LNS AT ART & 1 LN AT ENTRY; ADD AUX LNS 1400' EB DIR E/O IC, 2,500' EB DIR W/O IC, 2,300' WB DIR W/O IC & 1,700' WB DIR E/O IC (EA0M590)

Fund	ENG	R/W	CON	Total	Prior	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
STP LOCAL	964			964	964							964
AGENCY	7,149	17,500	71,000	95,649	2,149		22,500		71,000			95,649
RIV080904 Total	8,113	17,500	71,000	96,613	3,113		22,500		71,000			96,613

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	Signage Begin	Signage End	System	Conformity Category	Amendment
RIV151220	Riverside	SCAB		7120003	CAY76	60	20	22.5			S	NON-EXEMPT	0
Description:							PTC	7,500			Agency	MORENO VALLEY	

IN WESTERN RIVERSIDE COUNTY IN THE CITY OF MORENO VALLEY ALONG SR 60 - WIDEN FROM TWO TO THREE LANES IN EACH DIRECTION IN THE EXISTING MEDIAN TO PROVIDE ONE ADDITIONAL GENERAL PURPOSE LANE IN EACH DIRECTION FROM REDLANDS BLVD. TO GILMAN SPRINGS RD.

Fund	ENG	R/W	CON	Total	Prior	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
CITY FUNDS	1,500		6,000	7,500			1,500				6,000	7,500
RIV151220 Total	1,500		6,000	7,500			1,500				6,000	7,500

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Appendix B

Interagency Consultation Documentation

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PM Hot Spot Analysis Project Lists

Review of PM Hot Spot Interagency Review Forms

October, 2018	Determination
RIV080904 October 2018	Not a POAQC - Hot Spot Analysis Not Required (EPA concurrence received before the meeting)
SR-74 Widening October 2018	Not a POAQC - Hot Spot Analysis Not Required (EPA concurrence received before the meeting)
LA0G1119update October 2018 LA0G1119update October 2018 track	(Was determined to be not a POAQC on September 25, 2018)
LALS04update October 2018 LALS04update October 2018 track	(Was determined to be not a POAQC on May 22, 2018)
RIV100107 October 2018 Figures 2-4 RIV100107 October 2018 RIV100107 October 2018 Figure 1	Not a POAQC - Hot Spot Analysis Not Required (EPA concurrence received before the meeting. Project sponsor will update PM hot spot interagency review form by adding PM10.)
RIV031215 October 2018	

RTIP ID# *(required)* RIV080904

TCWG Consideration Date October 23, 2018

Project Description *(clearly describe project)*

The City of Moreno Valley (City), in cooperation with the California Department of Transportation (Caltrans) District 8, proposes to reconstruct and improve the State Route 60 (SR-60)/World Logistics Center Parkway (WLC Pkwy) (formerly Theodore Street) interchange. The majority of the project site is located in the City of Moreno Valley; however, the northeast quadrant of the site is located within unincorporated Riverside County (County) but within the City's Sphere of Influence.

Although the City's General Plan Circulation Element designates WLC Pkwy as a Minor Arterial (two lanes in each direction), existing WLC Pkwy through the project limits is 1 travel lane in each direction, including on the overcrossing over SR-60. Existing SR-60 between Redlands Boulevard and Gilman Springs Road is 2 mixed flow travel lanes in each direction. The proposed project would construct modifications to the existing SR-60/WLC Pkwy interchange from Post Mile 20.0 to Post Mile 22.0 on SR-60, a distance of approximately 2 miles (mi). Major improvements to the interchange will include: (1) reconstruction of the westbound and eastbound on- and off-ramps to SR-60, and (2) replacement of the existing WLC Pkwy overcrossing with an expanded four-lane overcrossing (two through lanes in each direction) with a minimum 16.5-foot (ft) vertical clearance between the eastbound and westbound SR-60 ramps and a six-lane cross-section on WLC Pkwy between the southern limits of the project and the eastbound SR-60 ramps. The proposed improvements to the on- and off-ramps would extend approximately 4,500 ft west and 2,900 ft east of the proposed overcrossing on SR-60 for proposed auxiliary lanes in each direction. The proposed improvements to Theodore Street/WLC Pkwy would extend approximately 2,300 ft north of SR-60 to Ironwood Avenue and approximately 3,200 ft south of SR 60. Project construction is anticipated to begin in early 2022 and be completed in winter 2023.

Three alternatives and two design variations will be evaluated in the environmental document for the proposed project: Alternative 1 (No Build Alternative [no project]), Alternative 2 (Modified Partial Cloverleaf), Alternative 6 (Modified Partial Cloverleaf with Roundabout Intersections), Alternative 2 with Design Variation and Alternative 6 with Design Variation. The Design Variations for each Build Alternative are similar and would realign the Eucalyptus Avenue to join WLC Pkwy approximately 900' south of the existing Eucalyptus Avenue/WLC Pkwy intersection. Both Build Alternatives would require six full right of way acquisitions, and there will be partial right-of-way acquisitions within all four quadrants of the interchange. One full acquisition would result in a residential displacement under both Build Alternatives.

During the construction phase of the proposed project, removal of the existing overcrossing and construction of the new overcrossing and ramps would interfere with access to the SR-60 at WLC Pkwy. The WLC Pkwy overcrossing is being evaluated for closure during construction of the proposed project. Therefore, if not done prior to this project, Eucalyptus Avenue would be extended and improved approximately 5,100 ft between WLC Pkwy and Redlands Boulevard to provide a detour route to SR-60. The improvements to Eucalyptus Avenue will be constructed early in the construction schedule, prior to the closure of the WLC Pkwy overcrossing. North of the freeway, access to SR-60 during construction would be provided via Ironwood Avenue and Redlands Boulevard. South of the freeway, access to SR-60 would be provided via Alessandro Boulevard and Gilman Springs Road and via Eucalyptus Avenue and Redlands Boulevard. Additional intersection improvements are proposed along the detour routes to facilitate vehicle movement.

As a result, widening is proposed at the Redlands Boulevard/Ironwood Avenue, WLC Pkwy/Alessandro Boulevard, and Alessandro Boulevard/Gilman Springs Road intersections. Consequently, signal modifications are proposed at the Redlands Boulevard/Ironwood Avenue and Redlands Boulevard/Eucalyptus Avenue intersections. A new signal would be installed at the Gilman Springs Road/Alessandro Boulevard intersection due to the high through movements on Gilman Springs Road conflicting with left turns to and from Alessandro Boulevard. The improvements required for the detour routes also include utility adjustments and/or relocations at Redlands Boulevard/Ironwood Avenue, WLC Pkwy/Alessandro Boulevard, and Alessandro Boulevard/Gilman Springs Road.

Alternative 1 (No Build)

The No Build Alternative assumes that no improvements will be made to the freeway mainline or to the existing SR-60/WLC Pkwy interchange. Without the planned improvements proposed as part of the project, the LOS at the on- and off-ramps and traffic operations at the interchange would continue to worsen over time. Alternative 1 was determined to not meet or satisfy the project purpose and need.

Common Design Features for Both Build Alternatives

As described further below, Alternatives 2 and 6 both propose to modify the SR-60/WLC Pkwy interchange and share several common design features. These common design features are discussed below by type of improvement.

Interchange On- and Off-Ramp Improvements. The proposed interchange is located approximately 1 mi east of the SR-60/Redlands Boulevard interchange and 0.7 mi west of the SR-60/Gilman Springs Road interchange. The new on- and off- ramps and the new bridge overcrossing would provide a direct and continuous alignment for WLC Pkwy traffic crossing SR-60. In accordance with the Caltrans District 8 Ramp Meter Design Manual, all interchange on-ramps would be two-lane and/or three-lane metered ramps, with sufficient right-of-way to accommodate vehicle storage, ramp meter equipment, and California Highway Patrol enforcement areas. Additionally, all on- ramps would provide high-occupancy vehicle (HOV) preferential lanes.

Roadway Improvements. Roadway improvements associated with the proposed project include the following:Provision of a six-lane cross-section on WLC Pkwy between the southern limits of the proposed project and the eastbound SR-60 ramps;

- Provision of a four-lane cross-section on WLC Pkwy between the eastbound and westbound SR-60 ramps;
- Provision of one northbound lane on Theodore Street between the westbound SR-60 ramps and Ironwood Avenue;
- Provision of two southbound lanes on Theodore Street between Ironwood Avenue and the westbound SR-60 ramps;
- Provision of an 8 ft to 16 ft wide parkway on the east side of WLC Pkwy between the eastbound SR-60 ramp intersection and the northern project limits;
- Provision of 16 ft wide parkway on the west side of WLC Pkwy between the westbound SR-60 ramp intersection and the northern project limits;
- Provision of a 14 ft wide parkway on the west side of WLC Pkwy between the southern project limits and the eastbound SR-60 ramp intersection;

- Provision of a 16 ft wide parkway on the east side of WLC Pkwy between the southern project limits and the eastbound SR-60 ramp intersection;
- Provision of a 18 ft wide parkway on both sides of Eucalyptus Avenue through the project limits;
- Improvement of Eucalyptus Avenue to a four-lane cross-section between Redlands Boulevard and WLC Pkwy; and
- Addition of one auxiliary lane in each direction between the Redlands Boulevard and Gilman Springs Road interchanges with SR-60.

The WLC Pkwy improvements listed above would have a design speed of 45 miles per hour (mph). Aside from the improvements listed above, no additional future widening on WLC Pkwy is planned within the interchange limits. The proposed overcrossing would be designed to the ultimate width.

Alternative 2 (Modified Partial Cloverleaf)

Alternative 2 proposes to reconstruct the SR-60/WLC Pkwy interchange in a modified partial cloverleaf configuration. Improvements under Alternative 2 would include the construction of a new westbound direct on-ramp and a new westbound loop off-ramp in the northwest quadrant of the interchange, in a cloverleaf configuration. A new eastbound direct off-ramp, a new eastbound loop on-ramp, and a new eastbound direct on-ramp would be constructed in the southwest and southeast quadrants, in a partial cloverleaf configuration.

Alternative 2 would also remove the existing two-lane (one lane in each direction) WLC Pkwy overcrossing and replace it with a new four-lane (two lanes in each direction) overcrossing that would be approximately 137 ft wide and 298 ft long. The proposed overcrossing would accommodate three turn lanes: two left-turn lanes in the northbound direction and one right-turn lane in the southbound direction.

Additional improvements as part of Alternative 2 include the installation of signals at both the proposed eastbound and westbound ramp intersections, as well as at the intersection of Eucalyptus Avenue/WLC Pkwy. Bike lanes would be provided on both sides of WLC Pkwy and Eucalyptus Avenue throughout the project limits.

Design Variation 2a – (Alternative 2 with Design Variation)

Design Variation 2a will have the same features as Alternative 2 with the exception of the location of the Eucalyptus Avenue/WLC Pkwy intersection. The Design Variation will consist of moving the current Eucalyptus Avenue/WLC Pkwy intersection approximately 900’ south from its current location. The shift will cause a partial realignment of Eucalyptus Avenue from approximately 2,600’ west of WLC Pkwy to connect with the west side of WLC Pkwy.

Alternative 6 (Modified Partial Cloverleaf with Roundabout Intersections)

Alternative 6 proposes to reconstruct the SR-60/WLC Pkwy interchange in a modified partial cloverleaf configuration. Improvements under Alternative 6 would include the construction of a new westbound direct on-ramp and a new westbound loop off-ramp in the northwest quadrant, in a partial cloverleaf configuration. New eastbound direct off- and on-ramps would be constructed in the southwest and southeast quadrants, respectively, in a partial cloverleaf configuration.

Similar to Alternative 2, Alternative 6 would also remove the existing two-lane (one lane in each direction) WLC Pkwy overcrossing and replace it with a new four-lane (two through lanes in each direction) overcrossing that would be approximately 90 ft wide and 245 ft long. Additional

improvements included as part of Alternative 6 include the installation of roundabouts at both the proposed eastbound and westbound ramp intersections, as well as at Eucalyptus Avenue/WLC Pkwy. On WLC Pkwy north of the Eucalyptus Avenue intersection and on Eucalyptus Avenue, bike lanes are provided on both sides within the width of the proposed shoulders. Bicyclists would have the option to merge with vehicular traffic to navigate through the roundabout or exit the travel lane prior to each roundabout and cross the roundabout with pedestrian traffic.

Design Variation 6a – (Alternative 6 with Design Variation)
Design Variation 6a will have the same features as Alternative 6 with the exception of the location of the Eucalyptus Avenue/WLC Pkwy intersection. The Design Variation will consist of moving the current Eucalyptus Avenue/WLC Pkwy intersection approximately 900' south from its current location. The shift will cause a partial realignment of Eucalyptus Avenue from approximately 2600' west of WLC Pkwy to connect to the west side of WLC Pkwy.

Type of Project *(use Table 1 on instruction sheet)*
Reconfigure existing interchange.

County	**Narrative Location/Route & Postmiles:**
Riverside	SR-60 (PM 20.0/22.0)

Lead Agency: City of Moreno Valley

Contact Person	**Phone#**	**Fax#**	**Email**
Margery Lazarus	(951) 413-3133	(951) 413-3170	margeryl@moval.org

Hot Spot Pollutant of Concern *(check one or both)* **PM2.5 x** **PM10 x**

Federal Action for which Project-Level PM Conformity is Needed *(check appropriate box)*

Categorical Exclusion (NEPA)	**EA or Draft EIS**	**FONSI or Final EIS**	**PS&E or Construction**	**Other**
	X			

Scheduled Date of Federal Action: February 2016

NEPA Delegation – Project Type *(check appropriate box)*

Exempt	**Section 326 –Categorical Exclusion**	**Section 327 – Non Categorical Exclusion**
		X

Current Programming Dates *(as appropriate)*

	PE/Environmental	**ENG**	**ROW**	**CON**
Start	2014	2020	2020	2022
End	2020	2022	2022	2024

Project Purpose and Need (Summary): *(attach additional sheets as necessary)*

Project Purpose

The purpose of the proposed project is to:

1. Provide increased interchange capacity, reduce congestion, and improve traffic operations to support the forecast travel demand for the 2045 design year;
2. Improve existing and projected interchange geometric deficiencies; and
3. Accommodate a multimodal facility that has harmony with the community and preserves the values of the area.

Project Need

The proposed project is needed for the following reasons:

1. According to the demographics and growth forecast prepared for the 2016 Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), between 2012 and 2040, Riverside County's population is expected to increase by 41 percent, job growth is anticipated to increase by 90 percent, and households are anticipated to increase by 51 percent. For Moreno Valley specifically, between 2012-2040, population is anticipated to increase by 30 percent, households jobs are anticipated to increase by 165 percent, and households are anticipated to increase by 41 percent. Without improvements, in the year 2045, the eastbound and westbound on-and off- ramps are anticipated to operate at unacceptable levels of service (LOS) (LOS E in the a.m. peak hour and F in the p.m. peak hour, respectively) and the ramp intersections with WLC Pkwy are anticipated to operate at LOS F for both the a.m. and p.m. peak hours. The westbound mainline segment on SR-60 between WLC Pkwy and Redlands Boulevard is anticipated to operate at LOS E during the a.m. peak hour. The Theodore Street intersections with Ironwood Avenue, and the WLC Pkwy intersections with the SR-60 westbound and eastbound ramps, and Eucalyptus Avenue are forecast to operate at LOS F in the p.m. peak hour.
2. The overpass bridge at the interchange was hit recently (January 2015) and a costly emergency repair project was required, so there is a need to bring vertical clearance up to current standards. In addition, the WLC Pkwy overcrossing is geometrically deficient and needs additional capacity to accommodate projected future travel volumes.
3. This project will fulfill the need to accommodate the movement of people using multiple modes of transportation by community-based design taking into consideration the natural environment, social environment, transportation behavior, cultural characteristics and economic environment.

Surrounding Land Use/Traffic Generators *(especially effect on diesel traffic)*

Surrounding land uses within the project area include rural residential, open space, and commercial uses. The largest traffic generator in the project area is the warehouse located to the south west of the existing interchange. The World Logistics Center (WLC), expected to be completed before 2040, would consist primarily of approximately 41 million square feet of high-cube logistics warehouse buildings. The WLC would significantly increase the number of diesel trucks operating within the project area.

Opening Year: Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility
2025 – WLC Pkwy:

See attached analysis

RTP Horizon Year / Design Year: Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility
2045 – WLC Pkwy:

See attached analysis

Opening Year: If facility is an interchange(s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT
2025 – SR-60:

See attached analysis

RTP Horizon Year / Design Year: If facility is an interchange (s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT
2045 – SR-60:

See attached analysis

Describe potential traffic redistribution effects of congestion relief *(impact on other facilities)*
See attached analysis

Comments/Explanation/Details *(attach additional sheets as necessary)*
See attached analysis

$PM_{2.5}$/PM_{10} Hot-Spot Analysis

The proposed project is located within a nonattainment area for the federal $PM_{2.5}$ standards and within an attainment/maintenance area for the federal PM_{10} standard. Therefore, per 40 CFR Part 93 hot-spot analyses are required for conformity purposes. However, the EPA does not require hot-spot analyses, qualitative or quantitative, for projects that are not listed in 40 CFR Section 93.123(b)(1) as an air quality concern. The project does not qualify as a project of air quality concern (POAQC) because of the following reasons:

i. The proposed project is an interchange reconfiguration project that will widen an existing regionally significant street. Based on the traffic data provided by WSP (October 2018), the proposed project would improve traffic flow without increasing the traffic volumes along World Logistics Center Parkway (WLC Pkwy) or State Route 60 (SR-60). As shown in Tables 1 and 2, the traffic volumes along SR-60 within the project area would exceed 125,000 average daily trips. In addition, the truck volumes on SR-60 would exceed the 10,000 and the truck percantages along all roadways within the project area would exceed 8 percent of the total traffic volume. However, as shown in Tables 1 and 2, the project would not change the traffic volumes on any of the roadways within the project area.

Table 1: 2025 Traffic Volumes (No Build and Build)

Roadway Link	2025 No Build			2025 Build (Alt 2 and 6)		
	Total ADT	Truck ADT	Truck %	Total ADT	Truck ADT	Truck %
Theodore Street - SR-60 WB Ramp to Ironwood Ave	2,267	655	29	2,267	655	29
WLC Pkwy - Eucalyptus Avenue to SR-60 EB Ramps	24,242	8,744	36	24,242	8,744	36
SR-60 - Redlands Boulevard to WLC Pkwy	92,116	15,490	17	92,116	15,490	17
Ironwood Avenue - Redlands Boulevard to Theodore Street	2,587	638	25	2,587	638	25
Eucalyptus Avenue - Redlands Boulevard to WLC Pkwy	1,668	861	52	1,668	861	52

Source: WSP, October 2018.

Table 2: 2045 Traffic Volumes (No Build and Build)

Roadway Link	2045 No Build			2045 Build (Alt 2 and 6)		
	Total ADT	Truck ADT	Truck %	Total ADT	Truck ADT	Truck %
Theodore Street - SR-60 WB Ramp to Ironwood Ave	14,618	1,054	7	14,618	1,054	7
WLC Pkwy - Eucalyptus Avenue to SR-60 EB Ramps	31,816	12,512	39	31,816	12,512	39
SR-60 - Redlands Boulevard to WLC Pkwy	168,384	23,699	14	168,384	23,699	14
Ironwood Avenue - Redlands Boulevard to Theodore Street	6,941	840	12	6,941	840	12
Eucalyptus Avenue - Redlands Boulevard to WLC Pkwy	5,370	1,308	24	5,370	1,308	24

Source: WSP, October 2018.

ii. The proposed project does not affect intersections that are at LOS D, E, or F with a significant number of diesel vehicles. Based on the traffic data provided by WSP, at intersections that are operating at LOS D, E, or F, the proposed project would maintain or improve the LOS. The LOS conditions in the project vicinity with and without the proposed project are shown in Tables 3 through 8.

Table 3: 2025 Without Project Intersection Levels of Service

Intersection	AM Peak Hour	PM Peak Hour
World Logistics Center Pkwy/Eucalyptus	A	A
World Logistics Center Pkwy/SR-60 EB Ramps	F	F
World Logistics Center Pkwy/SR-60 WB Ramps	F	F
Theodore St/Ironwood Ave	A	A

Source: WSP, October 2018.

Table 4: 2025 With Alternative 2 Intersection Levels of Service

Intersection	AM Peak Hour	PM Peak Hour
World Logistics Center Pkwy/Eucalyptus	A	A
World Logistics Center Pkwy/SR-60 EB Ramps	B	B
World Logistics Center Pkwy/SR-60 WB Ramps	B	B
Theodore St/Ironwood Ave	A	A

Source: WSP, October 2018.

Table 5: 2025 With Alternative 6 Intersection Levels of Service

Intersection	AM Peak Hour	PM Peak Hour
World Logistics Center Pkwy/Eucalyptus	B	B
World Logistics Center Pkwy/SR-60 EB Ramps	A	A
World Logistics Center Pkwy/SR-60 WB Ramps	A	A
Theodore St/Ironwood Ave	A	A

Source: WSP, October 2018.

Table 6: 2045 Without Project Intersection Levels of Service

Intersection	AM Peak Hour	PM Peak Hour
World Logistics Center Pkwy/Eucalyptus	D	D
World Logistics Center Pkwy/SR-60 EB Ramps	F	F
World Logistics Center Pkwy/SR-60 WB Ramps	F	F
Theodore St/Ironwood Ave	A	A

Source: WSP, October 2018.

Table 7: 2045 With Alternative 2 Intersection Levels of Service

Intersection	AM Peak Hour	PM Peak Hour
World Logistics Center Pkwy/Eucalyptus	D	D
World Logistics Center Pkwy/SR-60 EB Ramps	B	C
World Logistics Center Pkwy/SR-60 WB Ramps	C	B
Theodore St/Ironwood Ave	A	A

Source: WSP, October 2018.

Table 8: 2045 With Alternative 6 Intersection Levels of Service

Intersection	AM Peak Hour	PM Peak Hour
World Logistics Center Pkwy/Eucalyptus	C	C
World Logistics Center Pkwy/SR-60 EB Ramps	B	B
World Logistics Center Pkwy/SR-60 WB Ramps	A	D
Theodore St/Ironwood Ave	A	A

Source: WSP, October 2018.

iii. The proposed project does not include the construction of a new bus or rail terminal.

iv. The proposed project does not expand an existing bus or rail terminal.

v. The proposed project is not in or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ and PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Therefore, the proposed project meets the Clean Air Act requirements and 40 CFR 93.116 without any explicit hot-spot analysis. The proposed project would not create a new, or worsen an existing, PM_{10} or $PM_{2.5}$ violation.

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Appendix C

Construction Emission Worksheets

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Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> SR-60/WLC Pkwy Interchange

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.99	9.77	10.09	10.44	0.44	10.00	2.47	0.39	2.08	0.02	2,117.60	0.58	0.02	2,138.97
Grading/Excavation	5.40	45.20	56.04	12.64	2.64	10.00	4.35	2.27	2.08	0.13	12,315.56	2.78	0.18	12,439.44
Drainage/Utilities/Sub-Grade	5.72	52.05	56.13	12.54	2.54	10.00	4.41	2.33	2.08	0.11	10,343.00	2.67	0.10	10,438.22
Paving	0.92	12.72	8.68	0.46	0.46	0.00	0.40	0.40	0.00	0.02	2,124.43	0.56	0.02	2,145.23
Maximum (pounds/day)	5.72	52.05	56.13	12.64	2.64	10.00	4.41	2.33	2.08	0.13	12,315.56	2.78	0.18	12,439.44
Total (tons/construction project)	0.87	7.69	8.78	2.09	0.41	1.68	0.71	0.36	0.35	0.02	1,816.71	0.43	0.02	1,834.45

Notes:

Project Start Year ->	2022
Project Length (months) ->	18
Total Project Area (acres) ->	10
Maximum Area Disturbed/Day (acres) ->	1
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	200	40
Grading/Excavation	400	0	810	0	1,120	40
Drainage/Utilities/Sub-Grade	0	0	0	0	720	40
Paving	0	0	0	0	320	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> SR-60/WLC Pkwy Interchange

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.02	0.19	0.20	0.21	0.01	0.20	0.05	0.01	0.04	0.00	41.93	0.01	0.00	38.42
Grading/Excavation	0.48	4.03	4.99	1.13	0.24	0.89	0.39	0.20	0.19	0.01	1,097.32	0.25	0.02	1,005.49
Drainage/Utilities/Sub-Grade	0.34	3.09	3.33	0.74	0.15	0.59	0.26	0.14	0.12	0.01	614.37	0.16	0.01	562.49
Paving	0.03	0.38	0.26	0.01	0.01	0.00	0.01	0.01	0.00	0.00	63.10	0.02	0.00	57.80
Maximum (tons/phase)	0.48	4.03	4.99	1.13	0.24	0.89	0.39	0.20	0.19	0.01	1097.32	0.25	0.02	1,005.49
Total (tons/construction project)	0.87	7.69	8.78	2.09	0.41	1.68	0.71	0.36	0.35	0.02	1816.71	0.43	0.02	1,664.20

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model
Data Entry Worksheet

Version 8.1.0

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	SR-60/WLC Pkwy Interchange	
Construction Start Year	2022	Enter a Year between 2014 and 2025 (inclusive)
Project Type	3	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	18.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.50	miles
Total Project Area	10.00	acres
Maximum Area Disturbed/Day	1.00	acre
Water Trucks Used?	1	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00		
	Grading/Excavation	15.00	200.00	200.00
	Drainage/Utilities/Sub-Grade	15.00		
	Paving	15.00		
Asphalt	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			

Mitigation Options

On-road Fleet Emissions Mitigation		Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation		Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		1.80		1/1/2022
Grading/Excavation		8.10		2/25/2022
Drainage/Utilities/Sub-Grade		5.40		10/30/2022
Paving		2.70		4/13/2023
Totals (Months)		18		

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		27	810.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0	0.00
Miles/round trip: Paving		30.00		0	0.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.07	0.37	1.39	0.10	0.04	0.01	1,548.71	0.00	0.05	1,563.97
Grading/Excavation (grams/mile)	0.07	0.37	1.39	0.10	0.04	0.01	1,548.71	0.00	0.05	1,563.97
Draining/Utilities/Sub-Grade (grams/mile)	0.06	0.37	1.27	0.10	0.04	0.01	1,543.37	0.00	0.05	1,558.58
Paving (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.12	0.66	2.48	0.18	0.07	0.03	2,765.61	0.01	0.09	2,792.86
Tons per const. Period - Grading/Excavation	0.01	0.06	0.22	0.02	0.01	0.00	246.42	0.00	0.01	248.84
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.01	0.06	0.22	0.02	0.01	0.00	246.42	0.00	0.01	248.84

Note: Asphalt Hauling emission default values can be overridden in cells D87 through D90, and F87 through F90.

Asphalt Hauling Emissions User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0	0.00
Miles/round trip: Paving		30.00		0	0.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.07	0.37	1.39	0.10	0.04	0.01	1,548.71	0.00	0.05	1,563.97
Grading/Excavation (grams/mile)	0.07	0.37	1.39	0.10	0.04	0.01	1,548.71	0.00	0.05	1,563.97
Draining/Utilities/Sub-Grade (grams/mile)	0.06	0.37	1.27	0.10	0.04	0.01	1,543.37	0.00	0.05	1,558.58
Paving (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Worker commute default values can be overridden in cells D113 through D118.

Worker Commute Emissions	User Override of Worker Commute Default Values	Default Values		
User Input				
Miles/ one-way trip		20	Calculated Daily Trips	Calculated Daily VMT
One-way trips/day		2		
No. of employees: Grubbing/Land Clearing		5	10	200.00
No. of employees: Grading/Excavation		28	56	1,120.00
No. of employees: Drainage/Utilities/Sub-Grade		18	36	720.00
No. of employees: Paving		8	16	320.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.02	0.92	0.09	0.05	0.02	0.00	348.29	0.01	0.00	349.59
Grading/Excavation (grams/mile)	0.02	0.92	0.09	0.05	0.02	0.00	348.29	0.01	0.00	349.59
Draining/Utilities/Sub-Grade (grams/mile)	0.02	0.88	0.09	0.05	0.02	0.00	340.81	0.01	0.00	342.04
Paving (grams/mile)	0.02	0.85	0.08	0.05	0.02	0.00	336.27	0.01	0.00	337.46
Grubbing/Land Clearing (grams/trip)	0.87	2.06	0.16	0.00	0.00	0.00	79.59	0.01	0.01	81.77
Grading/Excavation (grams/trip)	0.87	2.06	0.16	0.00	0.00	0.00	79.59	0.01	0.01	81.77
Draining/Utilities/Sub-Grade (grams/trip)	0.83	1.93	0.14	0.00	0.00	0.00	78.10	0.01	0.01	80.12
Paving (grams/trip)	0.81	1.86	0.14	0.00	0.00	0.00	77.20	0.01	0.01	79.12
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.03	0.45	0.04	0.02	0.01	0.00	155.32	0.00	0.00	155.95
Tons per const. Period - Grubbing/Land Clearing	0.00	0.01	0.00	0.00	0.00	0.00	3.08	0.00	0.00	3.09
Pounds per day - Grading/Excavation	0.15	2.52	0.25	0.12	0.05	0.01	869.81	0.02	0.01	873.31
Tons per const. Period - Grading/Excavation	0.01	0.22	0.02	0.01	0.00	0.00	77.50	0.00	0.00	77.81
Pounds per day - Drainage/Utilities/Sub-Grade	0.09	1.55	0.15	0.07	0.03	0.01	547.17	0.01	0.01	549.29
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.01	0.09	0.01	0.00	0.00	0.00	32.50	0.00	0.00	32.63
Pounds per day - Paving	0.04	0.67	0.06	0.03	0.01	0.00	239.96	0.00	0.00	240.86
Tons per const. Period - Paving	0.00	0.02	0.00	0.00	0.00	0.00	7.13	0.00	0.00	7.15
Total tons per construction project	0.02	0.35	0.03	0.02	0.01	0.00	120.20	0.00	0.00	120.68

Note: Water Truck default values can be overridden in cells D145 through D148, and F145 through F148.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Vehicle/Day	Default Values Miles Traveled/Vehicle/Day	Calculated Daily VMT
User Input					
Grubbing/Land Clearing - Exhaust		1		40.00	40.00
Grading/Excavation - Exhaust		1		40.00	40.00
Drainage/Utilities/Subgrade		1		40.00	40.00
Paving		1		40.00	40.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.07	0.37	1.39	0.10	0.04	0.01	1,548.71	0.00	0.05	1,563.97
Grading/Excavation (grams/mile)	0.07	0.37	1.39	0.10	0.04	0.01	1,548.71	0.00	0.05	1,563.97
Draining/Utilities/Sub-Grade (grams/mile)	0.06	0.37	1.27	0.10	0.04	0.01	1,543.37	0.00	0.05	1,558.58
Paving (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.01	0.03	0.12	0.01	0.00	0.00	136.57	0.00	0.00	137.92
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	2.70	0.00	0.00	2.73
Pounds per day - Grading/Excavation	0.01	0.03	0.12	0.01	0.00	0.00	136.57	0.00	0.00	137.92
Tons per const. Period - Grading/Excavation	0.00	0.00	0.01	0.00	0.00	0.00	12.17	0.00	0.00	12.29
Pounds per day - Drainage/Utilities/Sub-Grade	0.01	0.03	0.11	0.01	0.00	0.00	136.10	0.00	0.00	137.44
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.01	0.00	0.00	0.00	8.08	0.00	0.00	8.16
Pounds per day - Paving	0.01	0.03	0.11	0.01	0.00	0.00	135.82	0.00	0.00	137.15
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	4.03	0.00	0.00	4.07
Total tons per construction project	0.00	0.01	0.02	0.00	0.00	0.00	26.99	0.00	0.00	27.26

Note: Fugitive dust default values can be overridden in cells D171 through D173.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		1.00	10.00	0.20	2.08	0.04
Fugitive Dust - Grading/Excavation		1.00	10.00	0.89	2.08	0.19
Fugitive Dust - Drainage/Utilities/Subgrade		1.00	10.00	0.59	2.08	0.12

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Crawler Tractors	0.48	2.27	5.89	0.22	0.20	0.01	744.71	0.24	0.01	752.74
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Excavators	0.42	6.72	3.67	0.18	0.16	0.01	1,031.68	0.33	0.01	1,042.80
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing	pounds per day	0.96	9.29	9.92	0.41	0.38	0.02	1,825.70	0.58	0.02	1,845.11
Grubbing/Land Clearing	tons per phase	0.02	0.18	0.20	0.01	0.01	0.00	36.15	0.01	0.00	36.53

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Cranes	0.36	1.85	4.09	0.17	0.16	0.01	546.73	0.18	0.00	552.63
1.00	2		Model Default Tier	Crawler Tractors	0.48	2.27	5.89	0.22	0.20	0.01	744.71	0.24	0.01	752.74
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	4		Model Default Tier	Excavators	0.42	6.72	3.67	0.18	0.16	0.01	1,031.68	0.33	0.01	1,042.80
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Graders	1.11	8.84	10.44	0.58	0.53	0.01	1,211.21	0.39	0.01	1,224.23
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00	3		Model Default Tier	Rollers	0.17	1.88	1.75	0.10	0.09	0.00	257.28	0.08	0.00	260.05
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	3		Model Default Tier	Rubber Tired Loaders	0.57	3.02	5.96	0.20	0.18	0.01	1,193.43	0.39	0.01	1,206.31
2.00	4		Model Default Tier	Scrapers	1.62	12.58	17.64	0.69	0.63	0.03	2,900.53	0.94	0.03	2,931.79
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.33	4.52	3.39	0.18	0.17	0.01	608.69	0.20	0.01	615.24
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grading/Excavation	pounds per day	5.13	41.98	53.19	2.34	2.15	0.09	8,543.57	2.75	0.08	8,635.36
Grading/Excavation	tons per phase	0.46	3.74	4.74	0.21	0.19	0.01	761.23	0.25	0.01	769.41

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Air Compressors	0.26	2.42	1.79	0.10	0.10	0.00	375.26	0.02	0.00	376.69
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Generator Sets	0.31	3.67	2.80	0.14	0.14	0.01	623.04	0.03	0.00	625.14
	2		Model Default Tier	Graders	1.03	8.77	9.53	0.53	0.48	0.01	1,211.04	0.39	0.01	1,224.06
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Plate Compactors	0.04	0.21	0.25	0.01	0.01	0.00	34.48	0.00	0.00	34.65
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pumps	0.34	3.73	2.83	0.14	0.14	0.01	623.04	0.03	0.00	625.18
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rough Terrain Forklifts	0.11	2.29	1.43	0.05	0.04	0.00	333.79	0.11	0.00	337.38
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		Model Default Tier	Scrapers	3.15	24.57	33.67	1.32	1.21	0.06	5,800.65	1.88	0.05	5,863.16
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.32	4.51	3.21	0.16	0.15	0.01	609.11	0.20	0.01	615.67
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Drainage/Utilities/Sub-Grade	pounds per day	5.62	50.47	55.87	2.46	2.29	0.10	9,659.72	2.66	0.08	9,751.49
Drainage/Utilities/Sub-Grade	tons per phase	0.33	3.00	3.32	0.15	0.14	0.01	573.79	0.16	0.01	579.24

Paving Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pavers	0.19	2.79	1.82	0.09	0.08	0.00	441.21	0.14	0.00	445.97
	1		Model Default Tier	Paving Equipment	0.17	2.54	1.59	0.08	0.07	0.00	391.48	0.13	0.00	395.70
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rollers	0.16	1.88	1.63	0.09	0.08	0.00	257.28	0.08	0.00	260.06
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.31	4.51	3.10	0.15	0.14	0.01	609.37	0.20	0.01	615.93
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Paving	pounds per day	0.87	12.02	8.51	0.42	0.39	0.02	1,748.66	0.55	0.02	1,767.22
	Paving	tons per phase	0.03	0.36	0.25	0.01	0.01	0.00	51.94	0.02	0.00	52.49
Total Emissions all Phases (tons per construction period) =>			0.84	7.28	8.51	0.37	0.35	0.01	1,423.10	0.43	0.01	1,437.67

Equipment default values for horsepower and hours/day can be overridden in cells D391 through D424 and F391 through F424.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		85		8
Excavators		163		8
Forklifts		89		8
Generator Sets		84		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		46		8

END OF DATA ENTRY SHEET

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Appendix D

CO Flow Chart (Based on the CO Protocol)

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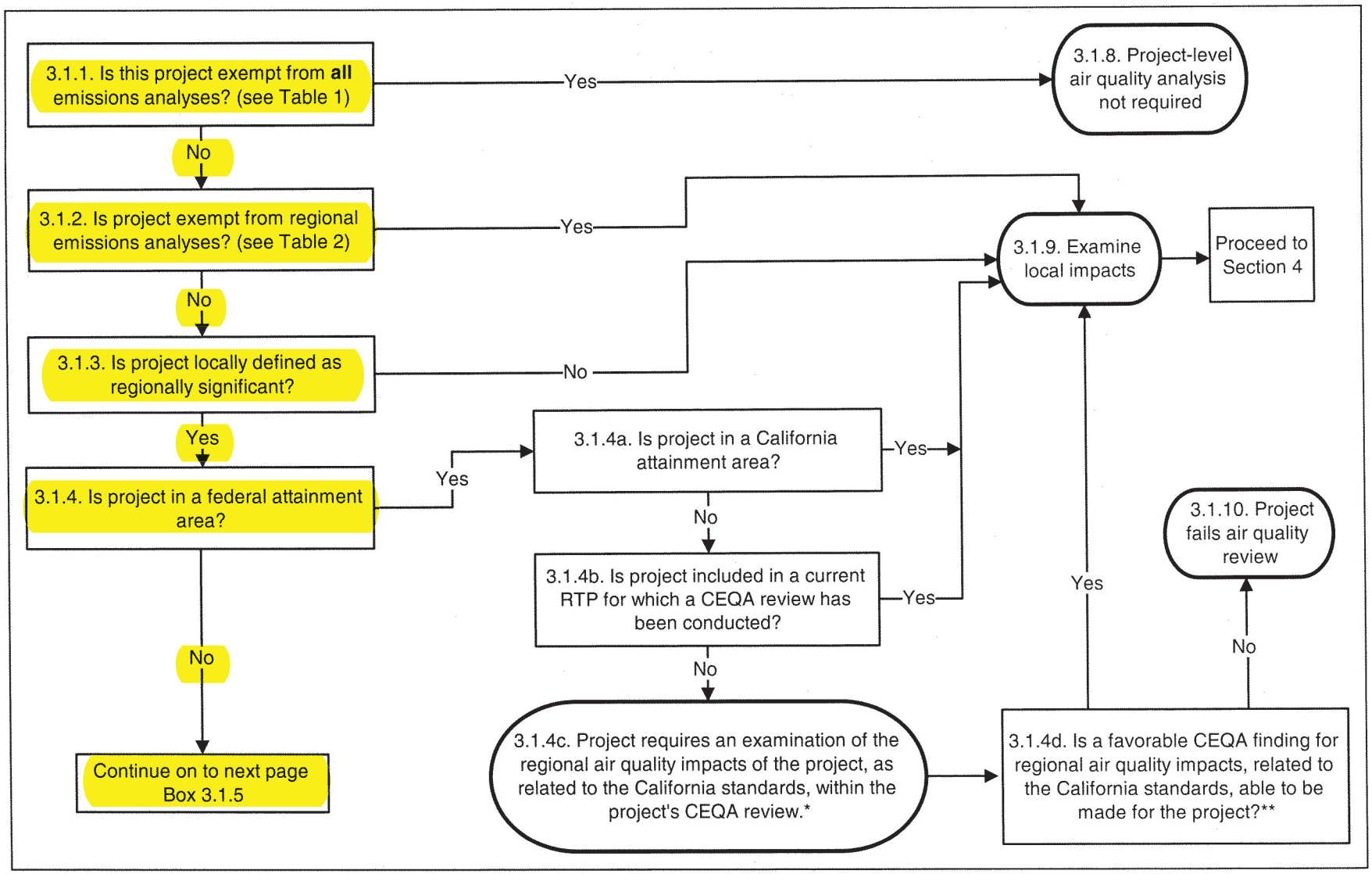

Figure 1. Requirements for New Projects

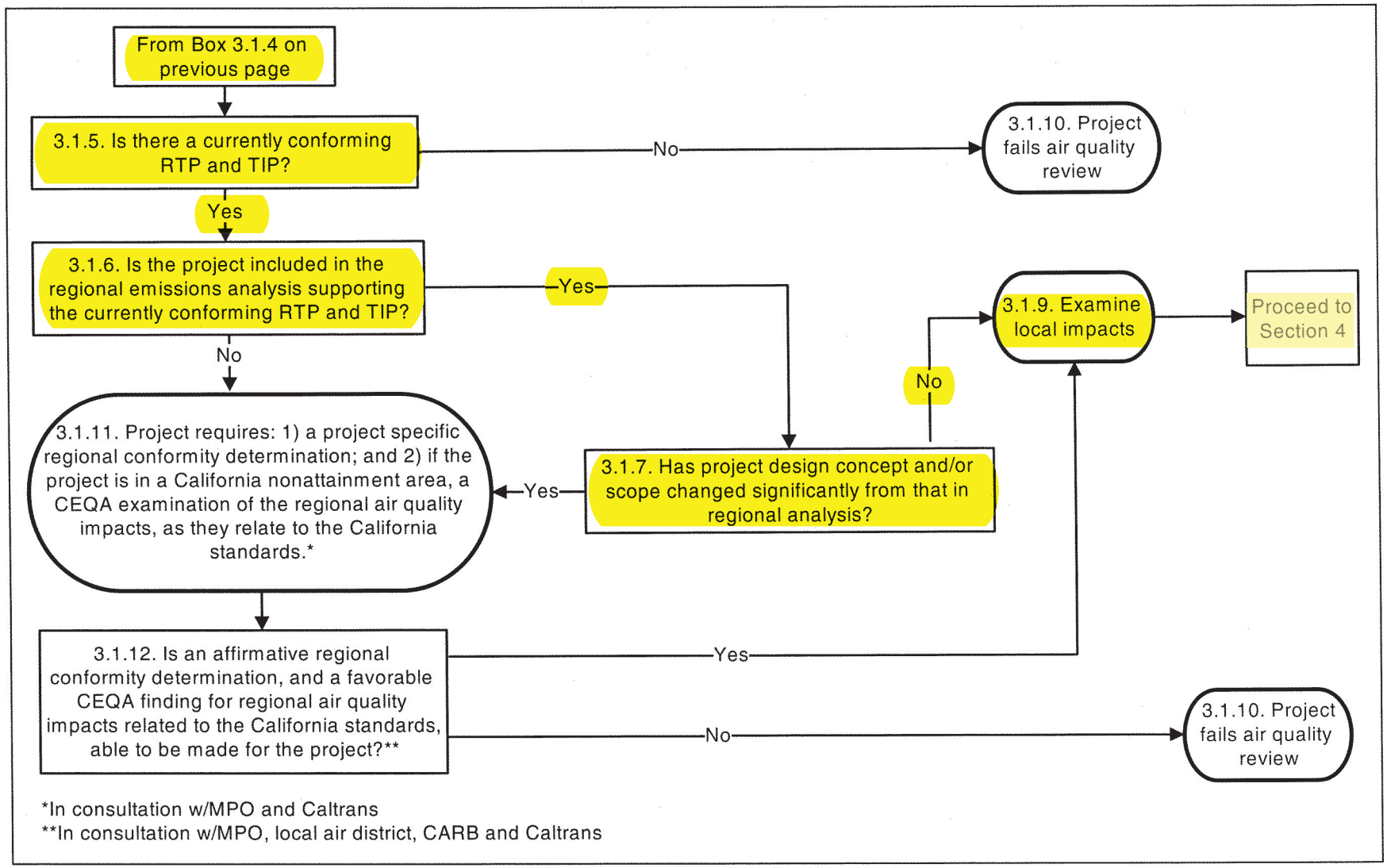

Figure 1 (cont.). Requirements for New Projects

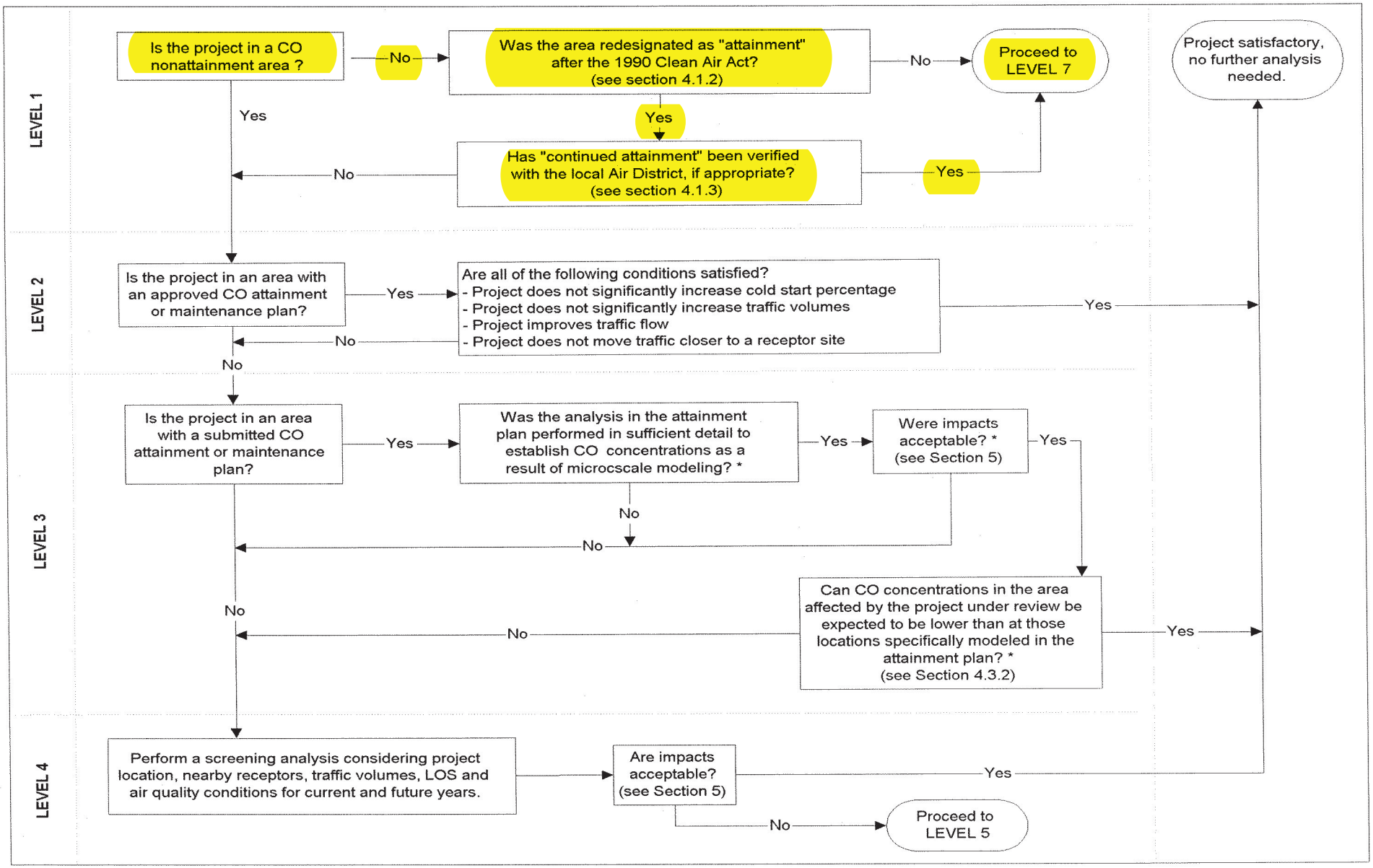

Figure 3. Local CO Analysis

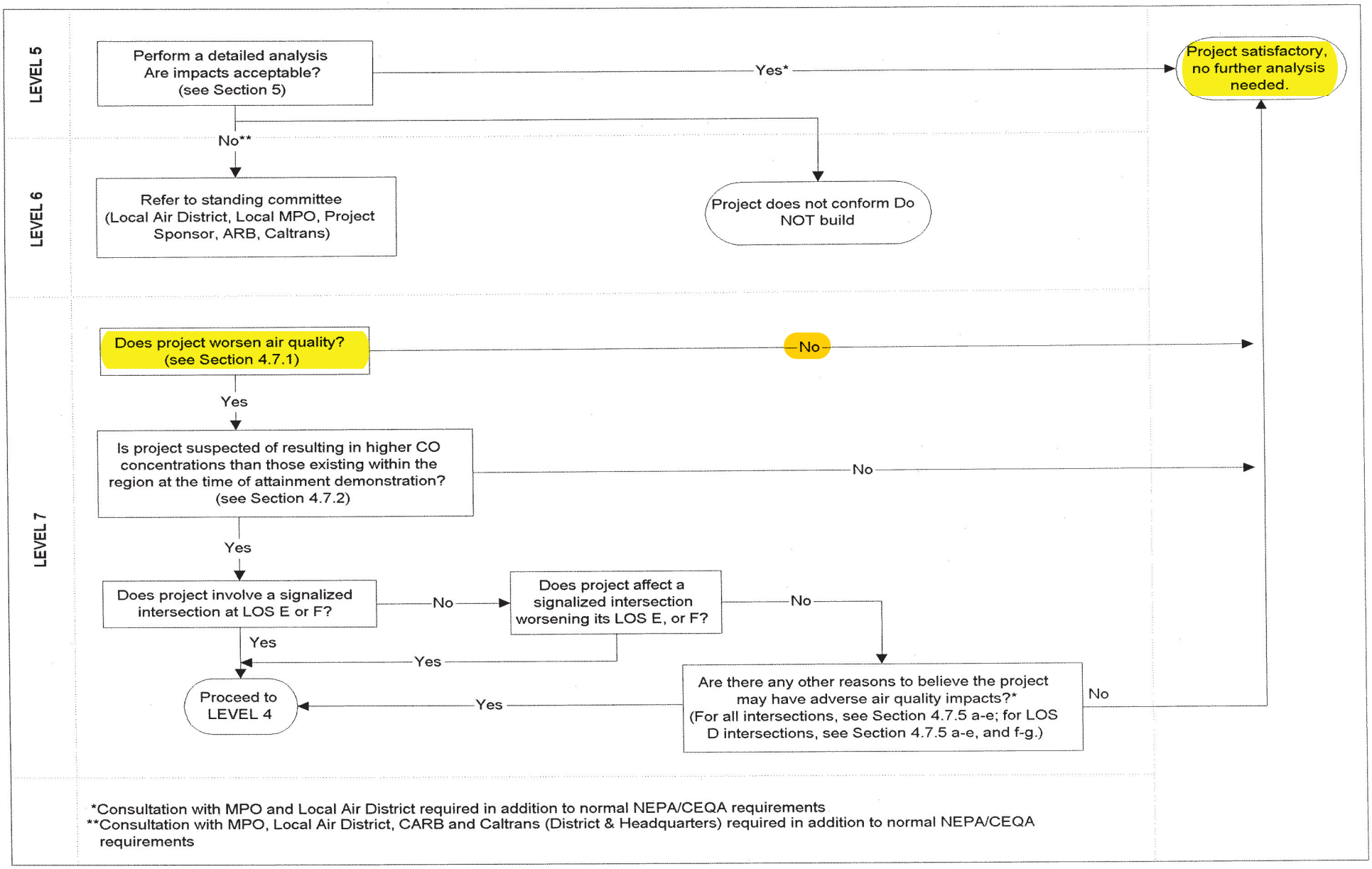

Figure 3 (cont.). Local CO Analysis

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Appendix E

EMFAC2017 Emissions Worksheets

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SR-60 Vehicle Emissions Worksheet

Light Vehicle GHG (CO_2e) Emissions on SR-60

Segment	Peak Hour	GHG (CO_2e) Emissions for Passenger Cars (grams/mile)								
		2018			2025			2045		
		Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
Eastbound SR-60	AM	311.7	313.3	313.3	258.1	258.1	258.1	205.3	206.1	206.1
	Freeflow	313.3	313.3	313.3	258.1	258.1	258.1	206.1	206.1	206.1
	PM	310.1	313.3	313.3	256.9	258.1	258.1	180.7	200.5	199.9
Westbound SR-60	AM	311.7	313.3	313.3	258.1	255.7	255.7	181.5	205.3	198.6
	Freeflow	313.3	313.3	313.3	258.1	258.1	258.1	206.1	206.1	206.1
	PM	311.7	313.3	313.3	258.1	256.9	256.9	202.7	205.3	200.5

CH4 GWP = 25
N2O GWP = 265

Heavy Truck GHG (CO_2e) Emissions on SR-60

Segment	Peak Hour	GHG (CO_2e) Emissions for Heavy Trucks (grams/mile)								
		2018			2025			2045		
		Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
Eastbound SR-60	AM	1,372.6	1,426.5	1,426.5	1,163.1	1,179.2	1,179.2	881.0	894.2	894.2
	Freeflow	1,446.4	1,446.4	1,446.4	1,240.3	1,240.3	1,240.3	953.1	953.1	953.1
	PM	1,372.6	1,406.6	1,406.6	1,163.1	1,163.1	1,179.2	1,038.8	843.0	843.0
Westbound SR-60	AM	1,372.6	1,383.9	1,383.9	1,163.1	1,130.9	1,130.9	886.9	881.0	835.4
	Freeflow	1,446.4	1,446.4	1,446.4	1,240.3	1,240.3	1,240.3	953.1	953.1	953.1
	PM	1,372.6	1,383.9	1,383.9	1,163.1	1,147.0	1,147.0	850.6	881.0	846.8

Time Period	Hours per day
AM Peak Hour	3
Mid-Day	17
PM Peak Hour	4

Total GHG (CO_2e) Emissions on SR-60

Segment	Time Period	GHG (CO_2e) Emissions for Passenger Cars (grams/day)								
		2018			2025			2045		
		Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
Eastbound SR-60	Daily	14,077,086	14,135,826	14,135,826	18,654,427	18,675,501	18,692,627	24,858,958	24,796,941	24,788,878
Westbound SR-60	Daily	13,908,745	13,933,410	13,933,410	18,138,847	18,075,584	18,075,584	24,192,939	24,483,154	24,248,096
Total SR-60 GHG Emissions (MT/day)		**28.0**	**28.1**	**28.1**	**36.8**	**36.8**	**36.8**	**49.1**	**49.3**	**49.0**
Total SR-60 GHG Emissions (MT/year)		**9,711**	**9,740**	**9,740**	**12,767**	**12,753**	**12,759**	**17,021**	**17,100**	**17,016**

Car Miles per day			Truck Miles per day		
2018	2025	2045	2018	2025	2045
32,159	42,190	74,657	2,826	6,384	10,220
29,578	39,236	72,222	3,268	6,580	10,315

347 Annual vehicle miles traveled (VMT) values derived from Daily VMT values multiplied by 347, per CARB methodology (CARB 2008).

Arterial Street Vehicle Emissions Worksheet

Light Vehicle GHG (CO_2e) Emissions on Arterials

Segment	Description	Time Period	GHG (CO_2e) Emissions for Passenger Cars (grams/mile)								
			2018			2025			2045		
			Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
1	WLC Pkwy: Eucalyptus Ave to Eastbound SR-60 Ramps	AM Peak Hour	299	426	272	223	552	309	180	306	332
		Mid-Day	282	338	271	223	290	309	182	376	332
		PM Peak Hour	274	291	271	223	223	309	184	460	347
3	Theodore St: Westbound SR-60 Ramps to Ironwood Ave	AM Peak Hour	269	269	269	226	299	226	460	409	248
		Mid-Day	269	276	269	223	318	224	460	332	224
		PM Peak Hour	269	330	269	225	354	224	460	285	209
4	Eucalyptus Ave: Redlands Blvd to WLC Pkwy	AM Peak Hour	269	282	269	413	245	224	332	264	182
		Mid-Day	269	278	269	413	245	223	332	248	183
		PM Peak Hour	269	276	269	413	245	223	347	232	184
5	Ironwood Ave: Redlands Blvd to Theodore St	AM Peak Hour	291	291	291	245	245	245	193	193	193
		Mid-Day	295	295	295	245	245	245	196	196	196
		PM Peak Hour	299	299	299	245	245	245	199	199	199

CH4 GWP = 25
N2O GWP = 265

Heavy Truck GHG (CO_2e) Emissions on Arterials

Segment	Description	Time Period	GHG (CO_2e) Emissions for Heavy Trucks (grams/mile)								
			2018			2025			2045		
			Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
1	WLC Pkwy: Eucalyptus Ave to Eastbound SR-60 Ramps	AM Peak Hour	2,000	2,971	1,704	1,341	3,434	2,078	1,039	1,839	2,022
		Mid-Day	1,819	2,209	1,674	1,341	2,005	2,078	1,084	2,203	2,022
		PM Peak Hour	1,733	1,905	1,674	1,370	1,370	2,078	1,141	2,561	2,022
3	Theodore St: Westbound SR-60 Ramps to Ironwood Ave	AM Peak Hour	1,615	1,561	1,586	1,398	2,005	1,398	2,561	2,382	1,581
		Mid-Day	1,561	1,776	1,561	1,312	2,151	1,370	2,561	2,022	1,531
		PM Peak Hour	1,561	2,157	1,561	1,237	2,296	1,370	2,561	1,655	1,349
4	Eucalyptus Ave: Redlands Blvd to WLC Pkwy	AM Peak Hour	1,645	1,819	1,561	3,008	1,624	1,370	2,022	1,630	1,084
		Mid-Day	1,615	1,819	1,561	3,008	1,624	1,370	2,022	1,581	1,112
		PM Peak Hour	1,615	1,776	1,561	3,008	1,624	1,370	2,022	1,556	1,141
5	Ironwood Ave: Redlands Blvd to Theodore St	AM Peak Hour	1,905	1,905	1,905	1,624	1,624	1,624	1,199	1,199	1,199
		Mid-Day	1,948	1,948	1,948	1,624	1,624	1,624	1,228	1,228	1,228
		PM Peak Hour	2,000	2,000	2,000	1,624	1,624	1,624	1,289	1,289	1,289

Time Period	Hours per day
AM Peak Hour	3
Mid-Day	17
PM Peak Hour	4

Total GHG (CO_2e) Emissions on Arterials

Segment	Description	Time Period	GHG (CO_2e) Emissions for Passenger Cars (grams/day)								
			2018			2025			2045		
			Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
1	WLC Pkwy: Eucalyptus Ave to Eastbound SR-60 Ramps	Daily	296,185	360,472	278,743	4,284,206	6,450,751	6,438,709	4,837,957	9,928,251	8,968,572
3	Theodore St: Westbound SR-60 Ramps to Ironwood Ave	Daily	261,467	295,438	261,016	334,199	523,326	344,474	2,644,540	1,950,056	1,348,934
4	Eucalyptus Ave: Redlands Blvd to WLC Pkwy	Daily	320,264	341,955	315,679	1,115,252	635,367	560,379	2,686,575	2,034,490	1,475,278
5	Ironwood Ave: Redlands Blvd to Theodore St	Daily	528,145	528,145	528,145	985,246	985,246	985,246	2,070,987	2,070,987	2,070,987
	Total Arterial GHG Emissions (MT/day)		**1.41**	**1.53**	**1.38**	**6.72**	**8.59**	**8.33**	**12.24**	**15.98**	**13.86**
	Total Arterial GHG Emissions (MT/year)		**487.9**	**529.5**	**480.1**	**2,331.5**	**2,982.4**	**2,890.1**	**4,247.3**	**5,546.4**	**4,810.7**

Car Miles per day			Truck Miles per day		
2018	2025	2045	2018	2025	2045
609	4,941	6,173	68	2,365	3,416
257	576	4,499	123	157	224
713	1,492	4,804	79	166	535
1,031	2,314	6,210	115	258	691

347 Annual vehicle miles traveled (VMT) values derived from Daily VMT values multiplied by 347, per CARB methodology (CARB 2008).

Intersection Queuing Emissions Worksheet

Light Vehicle GHG (CO_2e) Idling Emissions at Arterial Intersections

Segment	Intersection	Peak Hour	GHG Emissions for Light Vehicles (grams/hour)						
			2018	2025			2045		
			Alt 1	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
1	WLC Pkwy & Eucalyptus Ave	AM	3,263	383,922	29,647	22,822	433,007	94,540	44,504
		PM	2,163	376,212	10,659	22,155	462,036	127,830	60,835
2	WLC Pkwy & SR-60 EB Ramps	AM	3,780	374,670	37,051	9,575	413,655	38,608	23,440
		PM	2,191	350,001	18,278	7,000	431,798	61,891	29,506
3	WLC Pkwy & SR-60 WB Ramps	AM	2,377	182,184	11,549	10,394	508,228	82,446	26,258
		PM	1,263	127,202	20,268	8,620	468,858	45,323	75,017
4	Theodore St & Ironwood Ave	AM	1,261	2,433	2,433	2,433	2,162	2,162	2,162
		PM	777	2,221	2,221	2,221	1,673	1,673	1,673
5	Redlands Blvd & Eucalyptus Ave	AM	8,542	20,175	20,175	20,175	43,554	43,554	43,554
		PM	15,776	28,468	28,468	28,468	68,737	68,737	68,737
6	Redlands Blvd & SR-60 EB Ramps	AM	25,705	11,597	11,597	11,597	16,235	16,235	16,235
		PM	49,060	20,268	20,268	20,268	50,011	50,011	50,011
7	Redlands Blvd & SR-60 WB Ramps	AM	48,559	15,652	15,652	15,652	24,360	24,360	24,360
		PM	51,016	17,792	17,792	17,792	24,870	24,870	24,870
8	Redlands Blvd & Ironwood Ave	AM	21,065	33,292	33,292	33,292	37,096	37,096	37,096
		PM	27,549	42,909	42,909	42,909	61,070	61,070	61,070

CH4 GWP = 25
N2O GWP = 265

Truck GHG (CO_2e) Idling Emissions at Arterial Intersections

Segment	Intersection	Peak Hour	GHG Emissions for Trucks (grams/hour)						
			2018	2025			2045		
			Alt 1	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
1	WLC Pkwy & Eucalyptus Ave	AM	479	223,852	17,286	13,307	281,105	61,375	28,891
		PM	318	219,356	6,215	12,918	299,951	82,986	39,493
2	WLC Pkwy & SR-60 EB Ramps	AM	555	218,457	21,603	5,583	268,542	25,064	15,217
		PM	322	204,073	10,657	4,081	280,320	40,179	19,155
3	WLC Pkwy & SR-60 WB Ramps	AM	1,501	60,405	3,829	3,446	29,722	4,822	1,536
		PM	797	42,175	6,720	2,858	27,420	2,651	4,387
4	Theodore St & Ironwood Ave	AM	796	807	807	807	126	126	126
		PM	491	736	736	736	98	98	98
5	Redlands Blvd & Eucalyptus Ave	AM	1,255	2,736	2,736	2,736	5,689	5,689	5,689
		PM	2,317	3,861	3,861	3,861	8,979	8,979	8,979
6	Redlands Blvd & SR-60 EB Ramps	AM	3,775	1,573	1,573	1,573	2,121	2,121	2,121
		PM	7,206	2,749	2,749	2,749	6,533	6,533	6,533
7	Redlands Blvd & SR-60 WB Ramps	AM	7,132	2,123	2,123	2,123	3,182	3,182	3,182
		PM	7,493	2,413	2,413	2,413	3,249	3,249	3,249
8	Redlands Blvd & Ironwood Ave	AM	3,094	4,515	4,515	4,515	4,846	4,846	4,846
		PM	4,046	5,820	5,820	5,820	7,978	7,978	7,978

Total GHG (CO_2e) Idling Emissions at Arterial Intersections

Segment	Description	Time Period	GHG Emissions (grams/day)						
			2018	2025			2045		
			Alt 1	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
1	World Logistics Center Pkwy/Eucalyptus Ave	Daily	21,147	4,205,594	208,299	248,676	5,190,283	1,311,009	621,498
3	World Logistics Center Pkwy/SR-60 EB Ramps	Daily	23,058	3,995,681	291,701	89,799	4,895,064	599,296	310,619
4	World Logistics Center Pkwy/SR-60 WB Ramps	Daily	19,874	1,405,272	154,088	87,432	3,598,961	453,696	401,000
5	Theodore St/Ironwood Ave	Daily	11,247	21,551	21,551	21,551	13,951	13,951	13,951
1	Redlands Blvd/Eucalyptus Ave	Daily	101,762	198,049	198,049	198,049	458,594	458,594	458,594
3	Redlands Blvd/SR-60 EB Ramps	Daily	313,504	131,579	131,579	131,579	281,243	281,243	281,243
4	Redlands Blvd/SR-60 WB Ramps/Spruce Ave	Daily	401,112	134,144	134,144	134,144	195,105	195,105	195,105
5	Redlands Blvd/Ironwood Ave	Daily	198,859	308,338	308,338	308,338	402,015	402,015	402,015
	Total Arterial GHG Emissions (MT/day)		**1.09**	**10.40**	**1.45**	**1.22**	**15.04**	**3.71**	**2.68**
	Total Arterial GHG Emissions (MT/year)		**378**	**3,609**	**502**	**423**	**5,217**	**1,289**	**931**

Time Period	Hours per day
AM Peak Hour	3
PM Peak Hour	4

Note: Assume that non-peak hours have little to no queueing.

347 Annual values derived from Daily values multiplied by 347, per CARB methodology (CARB 2008).

Vehicle Speed and Delay Data

Exhibit 2: Peak Hour Average Passenger Car Speeds on SR-60

Segment	Peak Hour	Average Speed for Passenger Cars (mph)								
		2018			2025			2045		
		Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
Eastbound SR-60	AM	68.4	73.1	73.1	69.1	70.8	70.9	68.7	69.6	69.5
	Freeflow	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
	PM	67.8	72.0	72.0	68.9	69.9	70.1	38.0	62.1	62.0
Westbound SR-60	AM	68.5	69.7	69.7	69.7	67.5	67.5	47.7	68.5	59.4
	Freeflow	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
	PM	68.1	69.7	69.6	69.7	68.6	68.6	65.1	68.1	62.8

Source: *Average Speed Data for Air Quality Analysis* Technical Memorandum, WSP, October 23, 2019

Exhibit 3: Peak Hour Average Heavy Truck Speeds on SR-60

Segment	Peak Hour	Average Speed for Heavy Trucks (mph)								
		2018			2025			2045		
		Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
Eastbound SR-60	AM	56.8	60.7	60.7	57.4	58.8	58.8	57.0	57.8	57.7
	Freeflow	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
	PM	56.3	59.8	59.8	57.2	58.0	58.2	31.5	51.5	51.5
Westbound SR-60	AM	56.9	57.9	57.9	57.9	56.0	56.0	39.6	56.9	49.3
	Freeflow	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
	PM	56.5	57.9	57.8	57.9	56.9	56.9	54.0	56.5	52.1

Source: *Average Speed Data for Air Quality Analysis* Technical Memorandum, WSP, October 23, 2019

Exhibit 5: Average Passenger Car Speeds on Arterials

Segment	Description	Time Period	Average Speed for Passenger Cars (mph)								
			2018			2025			2045		
			Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
1	WLC Pkwy: Eucalyptus Ave to Eastbound SR-60 Ramps	AM Peak Hour	30	18	38	41	7	22	39	16	14
		Mid-Day	34	25	39	41	24	22	37	11	14
		PM Peak Hour	37	32	39	40	40	22	35	6	13
2	WLC Pkwy: Eastbound SR-60 Ramps to Westbound SR-60	AM Peak Hour	50	35	35	50	35	31	50	40	27
		Mid-Day	50	37	36	50	29	31	50	31	25
		PM Peak Hour	50	39	37	50	22	31	50	22	22
3	Theodore St: Westbound SR-60 Ramps to Ironwood	AM Peak Hour	42	45	43	38	23	38	6	9	22
		Mid-Day	44	36	44	42	21	39	6	14	25
		PM Peak Hour	45	26	45	46	18	39	6	18	28
4	Eucalyptus Ave: Redlands Blvd to WLC Pkwy	AM Peak Hour	41	34	44	14	31	39	14	20	37
		Mid-Day	42	35	45	14	31	40	14	22	36
		PM Peak Hour	42	36	45	14	31	40	13	24	35
5	Ironwood Ave: Redlands Blvd to Theodore St	AM Peak Hour	32	32	32	31	31	31	32	32	32
		Mid-Day	31	31	31	31	31	31	31	31	31
		PM Peak Hour	30	30	30	31	31	31	30	30	30
6	Redlands Blvd: Eucalyptus Ave to Eastbound SR-60	AM Peak Hour	17	17	17	15	15	15	14	14	14
		Mid-Day	16	16	16	15	15	15	11	11	11
		PM Peak Hour	14	14	14	14	14	14	7	7	7
7	Redlands Blvd: Eastbound SR-60 Ramps to Westbound	AM Peak Hour	11	11	11	41	41	41	42	42	42
		Mid-Day	12	12	12	39	39	39	45	45	45
		PM Peak Hour	12	12	12	36	36	36	48	48	48
8	Redlands Blvd: Westbound SR-60 Ramps to Ironwood	AM Peak Hour	26	26	26	41	41	41	26	26	26
		Mid-Day	25	25	25	36	36	36	25	25	25
		PM Peak Hour	24	24	24	30	30	30	24	24	24

Source: *Average Speed Data for Air Quality Analysis* Technical Memorandum, WSP, October 23, 2019

Vehicle Speed and Delay Data

Exhibit 6: Average Heavy Truck Speeds on Arterials

Segment	Description	Time Period	Average Speed for Heavy Trucks (mph)								
			2018			2025			2045		
			Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6	Alt 1	Alt 2	Alt 6
1	WLC Pkwy: Eucalyptus Ave to Eastbound SR-60 Ramps	AM Peak Hour	24	15	31	33	6	18	32	13	11
		Mid-Day	28	20	32	33	19	18	30	9	11
		PM Peak Hour	30	26	32	32	32	18	28	5	11
2	WLC Pkwy: Eastbound SR-60 Ramps to Westbound SR-60	AM Peak Hour	41	28	28	41	28	25	41	32	22
		Mid-Day	41	30	29	41	23	25	41	25	20
		PM Peak Hour	41	32	30	41	18	25	41	18	18
3	Theodore St: Westbound SR-60 Ramps to Ironwood	AM Peak Hour	34	36	35	31	19	31	5	7	18
		Mid-Day	36	29	36	34	17	32	5	11	20
		PM Peak Hour	36	21	36	37	15	32	5	15	23
4	Eucalyptus Ave: Redlands Blvd to WLC Pkwy	AM Peak Hour	33	28	36	11	25	32	11	16	30
		Mid-Day	34	28	36	11	25	32	11	18	29
		PM Peak Hour	34	29	36	11	25	32	11	19	28
5	Ironwood Ave: Redlands Blvd to Theodore St	AM Peak Hour	26	26	26	25	25	25	26	26	26
		Mid-Day	25	25	25	25	25	25	25	25	25
		PM Peak Hour	24	24	24	25	25	25	24	24	24
6	Redlands Blvd: Eucalyptus Ave to Eastbound SR-60	AM Peak Hour	14	14	14	12	12	12	11	11	11
		Mid-Day	13	13	13	12	12	12	9	9	9
		PM Peak Hour	11	11	11	11	11	11	6	6	6
7	Redlands Blvd: Eastbound SR-60 Ramps to Westbound	AM Peak Hour	9	9	9	33	33	33	34	34	34
		Mid-Day	10	10	10	32	32	32	36	36	36
		PM Peak Hour	10	10	10	29	29	29	39	39	39
8	Redlands Blvd: Westbound SR-60 Ramps to Ironwood	AM Peak Hour	21	21	21	33	33	33	21	21	21
		Mid-Day	20	20	20	29	29	29	20	20	20
		PM Peak Hour	19	19	19	24	24	24	19	19	19

Source: *Average Speed Data for Air Quality Analysis* Technical Memorandum, WSP, October 23, 2019

Intersection Delay

ID	Intersection Name	Control Type	Existing		2025 No-Build		2025 Alternative 2		2025 Alternative 6	
			AM Peak Hour Delay (sec/veh)	PM Peak Hour Delay (sec/veh)	AM Peak Hour Delay (sec/veh)	PM Peak Hour Delay (sec/veh)	AM Peak Hour Delay (sec/veh)	PM Peak Hour Delay (sec/veh)	AM Peak Hour Delay (sec/veh)	PM Peak Hour Delay (sec/veh)
1	World Logistics Center Pkwy/Eucalyptus Ave	CSS	10.0	9.2	180.0	180.0	13.9	5.1	10.7	10.6
2	World Logistics Center Pkwy/SR-60 EB Ramps	CSS	10.1	9.0	180.0	180.0	17.8	9.4	4.6	3.6
3	World Logistics Center Pkwy/SR-60 WB Ramps	CSS	10.3	9.4	126.2	109.2	8.0	17.4	7.2	7.4
4	Theodore St/Ironwood Ave	CSS	8.8	8.8	9.4	9.7	9.4	9.7	9.4	9.7
5	Redlands Blvd/Eucalyptus Ave	Signal	7.8	13.1	13.3	15.7	13.3	15.7	13.3	15.7
6	Redlands Blvd/SR-60 EB Ramps	Signal	19.1	27.9	6.4	7.8	6.4	7.8	6.4	7.8
7	Redlands Blvd/SR-60 WB Ramps/Spruce Ave	Signal	30.6	26.5	6.3	6.7	6.3	6.7	6.3	6.7
8	Redlands Blvd/Ironwood Ave	Signal	12.8	13.2	13.4	15.0	13.4	15.0	13.4	15.0

Source: SR-60/Theodore Interchange PA/ED Methodology and Traffic Volumes Report EA OM590, August 2018

Note: For signalized intersections, average intersection delay and LOS are reported.

Intersection Delay

ID	Intersection Name	Control Type	2045 No-Build		2045 Alternative 2		2045 Alternative 6	
			AM Peak Hour Delay (sec/veh)	PM Peak Hour Delay (sec/veh)	AM Peak Hour Delay (sec/veh)	PM Peak Hour Delay (sec/veh)	AM Peak Hour Delay (sec/veh)	PM Peak Hour Delay (sec/veh)
1	World Logistics Center Pkwy/Eucalyptus Ave	CSS	180.0	180.0	39.3	49.8	18.5	23.7
2	World Logistics Center Pkwy/SR-60 EB Ramps	CSS	180.0	180.0	16.8	25.8	10.2	12.3
3	World Logistics Center Pkwy/SR-60 WB Ramps	CSS	180.0	180.0	29.2	17.4	9.3	28.8
4	Theodore St/Ironwood Ave	CSS	1.5	1.1	1.5	1.1	1.5	1.1
5	Redlands Blvd/Eucalyptus Ave	Signal	17.5	22.8	17.5	22.8	17.5	22.8
6	Redlands Blvd/SR-60 EB Ramps	Signal	6.7	15.0	6.7	15.0	6.7	15.0
7	Redlands Blvd/SR-60 WB Ramps/Spruce Ave	Signal	9.9	9.1	9.9	9.1	9.9	9.1
8	Redlands Blvd/Ironwood Ave	Signal	17.4	22.5	17.4	22.5	17.4	22.5

Source: SR-60/Theodore Interchange PA/ED Methodology and Traffic Volumes Report EA OM590, August 2018

Note: For signalized intersections, average intersection delay and LOS are reported.

SR-60 Mainline Daily ADT & VMT

Daily Mainline Traffic Volumes by Vehicle Classification

SR-60 Mainline		Daily					Road Length (m)	VMT	
		Car	Light Truck	Medium Truck	Heavy Truck	Total Veh		Cars	Trucks
Existing									
WB	SR-60 between Theodore St and Redlands Blvd	28,937	812	80	3,207	33,036	1,600	29,578	3,268
EB	SR-60 between Redlands Blvd and Theodore St	31,294	1,051	183	2,859	35,387	1,600	32,159	3,024
Year 2025									
WB	SR-60 between Theodore St and Redlands Blvd	38,325	1,138	700	5,918	46,081	1,600	39,236	6,580
EB	SR-60 between Redlands Blvd and Theodore St	41,080	1,354	788	5,633	48,855	1,600	42,190	6,384
Year 2045									
WB	SR-60 between Theodore St and Redlands Blvd	71,211	1,429	1,335	9,040	83,015	1,600	72,222	10,315
EB	SR-60 between Redlands Blvd and Theodore St	73,474	1,616	1,414	8,865	85,369	1,600	74,657	10,220

Source: SR-60/Theodore Interchange PA/ED Methodology and Traffic Volumes Report EA OM590, August 2018

Attachment 3: Freeway, Ramp, and Arterial Volumes by Vehicle Classification for Noise, Air Quality and Traffic Index and Other Environmental Analyses

For the VMT calculation Car and Light Truck ADT were combined for Cars, Medium Truck and Heavy Truck combined for Trucks

VMT calculated by multiplying daily ADT by road length (i.e., for the first row for cars: [28,937 + 812] x 1,600 x 0.0006214 = 29,578 vmt)

Intersection Vehicle per Hour Data

Intersection Name	Control Type	Existing		2025 No-Build		2025 with Alt 2 & Alt		2045 No-Build		2025 with Alt 2 & Alt	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
		Veh/hr	Veh/hr	Veh/hr	Veh/hr	Veh/hr	Veh/hr	Veh/hr	Veh/hr	Veh/hr	Veh/hr
World Logistics Center Pkwy/Eucalyptus Ave	CSS	272	196	2,490	2,440	2,490	2,440	3,580	3,820	3,580	3,820
World Logistics Center Pkwy/SR-60 EB Ramps	CSS	312	203	2,430	2,270	2,430	2,270	3,420	3,570	3,420	3,570
World Logistics Center Pkwy/SR-60 WB Ramps	CSS	256	149	1,450	1,170	1,450	1,170	2,840	2,620	2,840	2,620
Theodore St/Ironwood Ave	CSS	159	98	260	230	260	230	1,450	1,530	1,450	1,530
Redlands Blvd/Eucalyptus Ave	Signal	913	1,004	1,331	1,591	1,331	1,591	2,650	3,210	2,650	3,210
Redlands Blvd/SR-60 EB Ramps	Signal	1,122	1,466	1,590	2,280	1,590	2,280	2,580	3,550	2,580	3,550
Redlands Blvd/SR-60 WB Ramps/Spruce Ave	Signal	1,323	1,605	2,180	2,330	2,180	2,330	2,620	2,910	2,620	2,910
Redlands Blvd/Ironwood Ave	Signal	1,372	1,740	2,180	2,510	2,180	2,510	2,270	2,890	2,270	2,890
		5,729	6,461	13,911	14,821	13,911	14,821	21,410	24,100	21,410	24,100

Source: SR-60/Theodore Interchange PA/ED Methodology and Traffic Volumes Report EA OM590, August 2018

Intersection veh/hr data from Exhibits 15 through 19

Daily Arterial ADT & VMT

Daily Arterial Traffic Volumes by Vehicle Classification

Arterial		Daily					Road Length (m)	VMT	
		Car	Light Truck	Medium Truck	Heavy Truck	Total Veh		Cars	Trucks
Existing									
NB SB	Theodore St - SR-60 WB Ramps to Ironwood Ave	677	117	69	311	1,174	520	257	123
NB SB	Theodore St - Eucalyptus Ave to SR-60 EB Ramps	1,905	116	114	111	2,246	485	609	68
	Ironwood Avenue - Redlands Boulevard to Theodore Street	977	59	59	56	1,152	1,600	1,031	115
	Eucalyptus Avenue - Redlands Boulevard to Theodore Street	676	41	41	39	797	1,600	713	79
Year 2025									
NB SB	Theodore St - SR-60 WB Ramps to Ironwood Ave	1,612	170	174	311	2,267	520	576	157
NB SB	Theodore St - Eucalyptus Ave to SR-60 EB Ramps	15,498	897	1,715	6,132	24,242	485	4,941	2,365
	Ironwood Avenue - Redlands Boulevard to Theodore Street	2,194	134	132	127	2,587	1,600	2,314	258
	Eucalyptus Avenue - Redlands Boulevard to Theodore Street	1,415	86	85	82	1,668	1,600	1,492	166
Year 2045									
NB SB	Theodore St - SR-60 WB Ramps to Ironwood Ave	13,564	360	348	346	14,618	520	4,499	224
NB SB	Theodore St - Eucalyptus Ave to SR-60 EB Ramps	19,304	1,179	2,230	9,103	31,816	485	6,173	3,416
	Ironwood Avenue - Redlands Boulevard to Theodore Street	5,887	358	355	340	6,941	1,600	6,210	691
	Eucalyptus Avenue - Redlands Boulevard to Theodore Street	4,555	277	275	263	5,370	1,600	4,804	535

Source: SR-60/Theodore Interchange PA/ED Methodology and Traffic Volumes Report EA OM590, August 2018

Attachment 3: Freeway, Ramp, and Arterial Volumes by Vehicle Classification for Noise, Air Quality and Traffic Index and Other Environmental Analyses

Ironwood Avenue and Eucalyptus Avenue total ADT from WSP via email, September 2018, proportioned by vehicle type using Exhibit 8 data.

For the VMT calculation Car and Light Truck ADT were combined for Cars, Medium Truck and Heavy Truck combined for Trucks

VMT calculated by multiplying daily ADT by road length (i.e., for the first row for cars: [677 + 117] x 520 x 0.0006214 = 257 vmt)

Exhibit 8: Surface Street Traffic Volume by Vehicle Class and Hour of Day

Period	Start	End	Motor-cycles	Cars & Trailers	2 Axle Long	% of Daily Passenger Vehicles	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axl Multi	6 Axle Multi	>6 Axle Multi	% of Daily Trucks
Night	10:00 PM	11:00 PM	4	28	8	15.9%	0	0									14.7%
	11:00 PM	12 MidN	4	9	3		0	1									
	12 MidN	1:00 AM	1	12	1		0	2									
	1:00 AM	2:00 AM	2	9			0	0									
	2:00 AM	3:00 AM	2	6			0	1									
	3:00 AM	4:00 AM	2	11	3		0	0									
	4:00 AM	5:00 AM	1	69	24		0	3									
	5:00 AM	6:00 AM	1	86	15		0	3									
AM Peak Period	6:00 AM	7:00 AM	3	48	10	17.1%	0	8									12.3%
	7:00 AM	8:00 AM	6	74	17		0	6									
	8:00 AM	9:00 AM	6	127	35		1	5									
Mid-Day	9:00 AM	10:00 AM	9	38	25	31.7%	1	12	8	0							40.5%
	10:00 AM	11:00 AM	5	56	23		3	10	6	0							
	11:00 AM	12NOON	8	67	25		1	7									
	12NOON	1:00 PM	6	79	22		1	3				10	0	1			
	1:00 PM	2:00 PM	10	94	27		1	6									
	2:00 PM	3:00 PM	11	78	21		1	8	10	0	1						
PM Peak Period	3:00 PM	4:00 PM	6	85	17	21.8%	1	8									17.3%
	4:00 PM	5:00 PM	12	82	18		0	5									
	5:00 PM	6:00 PM	12	77	15		0	10	7	0							
	6:00 PM	7:00 PM	5	72	14		0	3									
Evening	7:00 PM	8:00 PM	3	61	7	13.5%	0	1									15.2%
	8:00 PM	9:00 PM	5	47	14		1	1				16	0	0			
	9:00 PM	10:00 PM	5	101	14		0	2				13	0	0			
24-Hour Total			129	1416	360	100.0%	11	105	114	1	21	86	0	3			100.0%
AM Peak Hour	7:00 AM	8:00 AM	6	74	17	5.1%	0	6									4.4%
PM Peak Hour	4:30 PM	5:30 PM	10	74	17	5.3%	0	8									3.5%

Source: SR-60/Theodore Interchange PA/ED Methodology and Traffic Volumes Report EA OM590, August 2018

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: RIVERSIDE
Calendar Year: 2018
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW

Region	Vehicle Category	Model Year	Speed	Fuel	VMT	CO2	RUNEX CH4	N2O
RIVERSIDE	HHDT	Aggregated	5	DSL	3048.995	4094.789	0.082312	0.643644
RIVERSIDE	HHDT	Aggregated	6	DSL		4171.986	0.074489	0.655778
RIVERSIDE	HHDT	Aggregated	7	DSL		4249.182	0.066667	0.667912
RIVERSIDE	HHDT	Aggregated	8	DSL		4326.379	0.058844	0.680047
RIVERSIDE	HHDT	Aggregated	9	DSL		4403.575	0.051021	0.692181
RIVERSIDE	HHDT	Aggregated	10	DSL	2197.933	4480.772	0.043199	0.704315
RIVERSIDE	HHDT	Aggregated	11	DSL		4154.964	0.041286	0.653102
RIVERSIDE	HHDT	Aggregated	12	DSL		3829.155	0.039373	0.60189
RIVERSIDE	HHDT	Aggregated	13	DSL		3503.347	0.03746	0.550677
RIVERSIDE	HHDT	Aggregated	14	DSL		3177.539	0.035548	0.499465
RIVERSIDE	HHDT	Aggregated	15	DSL	3119.673	2851.73	0.033635	0.448252
RIVERSIDE	HHDT	Aggregated	16	DSL		2705.389	0.03157	0.42525
RIVERSIDE	HHDT	Aggregated	17	DSL		2559.048	0.029505	0.402247
RIVERSIDE	HHDT	Aggregated	18	DSL		2412.707	0.027441	0.379244
RIVERSIDE	HHDT	Aggregated	19	DSL		2266.366	0.025376	0.356241
RIVERSIDE	HHDT	Aggregated	20	DSL	47585.02	2120.025	0.023312	0.333238
RIVERSIDE	HHDT	Aggregated	21	DSL		2069.961	0.021373	0.325369
RIVERSIDE	HHDT	Aggregated	22	DSL		2019.896	0.019434	0.3175
RIVERSIDE	HHDT	Aggregated	23	DSL		1969.831	0.017496	0.30963
RIVERSIDE	HHDT	Aggregated	24	DSL		1919.767	0.015557	0.301761
RIVERSIDE	HHDT	Aggregated	25	DSL	55585.13	1869.702	0.013619	0.293891
RIVERSIDE	HHDT	Aggregated	26	DSL		1828.472	0.013113	0.28741
RIVERSIDE	HHDT	Aggregated	27	DSL		1787.241	0.012608	0.280929
RIVERSIDE	HHDT	Aggregated	28	DSL		1746.01	0.012103	0.274448
RIVERSIDE	HHDT	Aggregated	29	DSL		1704.78	0.011598	0.267968
RIVERSIDE	HHDT	Aggregated	30	DSL	111020.9	1663.549	0.011093	0.261487
RIVERSIDE	HHDT	Aggregated	31	DSL		1635.28	0.010661	0.257043
RIVERSIDE	HHDT	Aggregated	32	DSL		1607.012	0.010228	0.2526
RIVERSIDE	HHDT	Aggregated	33	DSL		1578.743	0.009796	0.248156
RIVERSIDE	HHDT	Aggregated	34	DSL		1550.475	0.009364	0.243713
RIVERSIDE	HHDT	Aggregated	35	DSL	133892.4	1522.206	0.008931	0.23927
RIVERSIDE	HHDT	Aggregated	36	DSL		1497.955	0.008598	0.235458
RIVERSIDE	HHDT	Aggregated	37	DSL		1473.704	0.008264	0.231646
RIVERSIDE	HHDT	Aggregated	38	DSL		1449.453	0.007931	0.227834
RIVERSIDE	HHDT	Aggregated	39	DSL		1425.201	0.007597	0.224022
RIVERSIDE	HHDT	Aggregated	40	DSL	136113.9	1400.95	0.007263	0.22021
RIVERSIDE	HHDT	Aggregated	41	DSL		1384.185	0.007019	0.217575
RIVERSIDE	HHDT	Aggregated	42	DSL		1367.419	0.006774	0.214939
RIVERSIDE	HHDT	Aggregated	43	DSL		1350.654	0.00653	0.212304
RIVERSIDE	HHDT	Aggregated	44	DSL		1333.888	0.006285	0.209669
RIVERSIDE	HHDT	Aggregated	45	DSL	173872.5	1317.123	0.006041	0.207033
RIVERSIDE	HHDT	Aggregated	46	DSL		1310.831	0.005948	0.206044
RIVERSIDE	HHDT	Aggregated	47	DSL		1304.539	0.005856	0.205055
RIVERSIDE	HHDT	Aggregated	48	DSL		1298.246	0.005763	0.204066
RIVERSIDE	HHDT	Aggregated	49	DSL		1291.954	0.005671	0.203077
RIVERSIDE	HHDT	Aggregated	50	DSL	243236.3	1285.662	0.005578	0.202088
RIVERSIDE	HHDT	Aggregated	51	DSL		1287.69	0.005542	0.202407
RIVERSIDE	HHDT	Aggregated	52	DSL		1289.718	0.005506	0.202726
RIVERSIDE	HHDT	Aggregated	53	DSL		1291.746	0.005469	0.203045
RIVERSIDE	HHDT	Aggregated	54	DSL		1293.774	0.005433	0.203363
RIVERSIDE	HHDT	Aggregated	55	DSL	335939.3	1295.802	0.005397	0.203682
RIVERSIDE	HHDT	Aggregated	56	DSL		1306.676	0.00543	0.205391
RIVERSIDE	HHDT	Aggregated	57	DSL		1317.551	0.005464	0.207101
RIVERSIDE	HHDT	Aggregated	58	DSL		1328.425	0.005497	0.20881
RIVERSIDE	HHDT	Aggregated	59	DSL		1339.299	0.005531	0.210519
RIVERSIDE	HHDT	Aggregated	60	DSL	534911.3	1350.173	0.005564	0.212228
RIVERSIDE	HHDT	Aggregated	61	DSL		1369.306	0.005593	0.215236
RIVERSIDE	HHDT	Aggregated	62	DSL		1388.44	0.005621	0.218243
RIVERSIDE	HHDT	Aggregated	63	DSL		1407.573	0.00565	0.221251
RIVERSIDE	HHDT	Aggregated	64	DSL		1426.706	0.005679	0.224258
RIVERSIDE	HHDT	Aggregated	65	DSL	629235.8	1445.84	0.005707	0.227266
RIVERSIDE	HHDT	Aggregated	66	DSL		1440.69	0.005558	0.226456
RIVERSIDE	HHDT	Aggregated	67	DSL		1435.54	0.005408	0.225647
RIVERSIDE	HHDT	Aggregated	68	DSL		1430.391	0.005258	0.224837
RIVERSIDE	HHDT	Aggregated	69	DSL		1425.241	0.005109	0.224028
RIVERSIDE	HHDT	Aggregated	70	DSL	1143589	1420.091	0.004959	0.223219

RIVERSIDE	LDA	Aggregated	5	GAS	38408.54	710.6568	0.028385	0.011227
RIVERSIDE	LDA	Aggregated	6	GAS		685.3599	0.026344	0.010926
RIVERSIDE	LDA	Aggregated	7	GAS		660.063	0.024303	0.010625
RIVERSIDE	LDA	Aggregated	8	GAS		634.766	0.022262	0.010324
RIVERSIDE	LDA	Aggregated	9	GAS		609.4691	0.020221	0.010023
RIVERSIDE	LDA	Aggregated	10	GAS	23271.05	584.1721	0.01818	0.009721
RIVERSIDE	LDA	Aggregated	11	GAS		561.4992	0.016933	0.009501
RIVERSIDE	LDA	Aggregated	12	GAS		538.8262	0.015687	0.00928
RIVERSIDE	LDA	Aggregated	13	GAS		516.1533	0.01444	0.009059
RIVERSIDE	LDA	Aggregated	14	GAS		493.4803	0.013194	0.008838
RIVERSIDE	LDA	Aggregated	15	GAS	53806.62	470.8073	0.011948	0.008617
RIVERSIDE	LDA	Aggregated	16	GAS		455.0914	0.01125	0.008435
RIVERSIDE	LDA	Aggregated	17	GAS		439.3755	0.010553	0.008253
RIVERSIDE	LDA	Aggregated	18	GAS		423.6595	0.009856	0.008071
RIVERSIDE	LDA	Aggregated	19	GAS		407.9436	0.009159	0.007889
RIVERSIDE	LDA	Aggregated	20	GAS	188799	392.2277	0.008462	0.007707
RIVERSIDE	LDA	Aggregated	21	GAS		380.9241	0.008034	0.007576
RIVERSIDE	LDA	Aggregated	22	GAS		369.6206	0.007605	0.007445
RIVERSIDE	LDA	Aggregated	23	GAS		358.3171	0.007177	0.007314
RIVERSIDE	LDA	Aggregated	24	GAS		347.0136	0.006749	0.007183
RIVERSIDE	LDA	Aggregated	25	GAS	1514355	335.7101	0.006321	0.007052
RIVERSIDE	LDA	Aggregated	26	GAS		328.0755	0.006046	0.006948
RIVERSIDE	LDA	Aggregated	27	GAS		320.441	0.00577	0.006843
RIVERSIDE	LDA	Aggregated	28	GAS		312.8064	0.005495	0.006739
RIVERSIDE	LDA	Aggregated	29	GAS		305.1719	0.00522	0.006634
RIVERSIDE	LDA	Aggregated	30	GAS	3067293	297.5374	0.004945	0.00653
RIVERSIDE	LDA	Aggregated	31	GAS		293.2053	0.004773	0.006454
RIVERSIDE	LDA	Aggregated	32	GAS		288.8732	0.004601	0.006379
RIVERSIDE	LDA	Aggregated	33	GAS		284.5411	0.00443	0.006304
RIVERSIDE	LDA	Aggregated	34	GAS		280.209	0.004258	0.006229
RIVERSIDE	LDA	Aggregated	35	GAS	3578258	275.8769	0.004086	0.006153
RIVERSIDE	LDA	Aggregated	36	GAS		274.1451	0.003983	0.006106
RIVERSIDE	LDA	Aggregated	37	GAS		272.4133	0.003879	0.006058
RIVERSIDE	LDA	Aggregated	38	GAS		270.6815	0.003776	0.00601
RIVERSIDE	LDA	Aggregated	39	GAS		268.9496	0.003673	0.005962
RIVERSIDE	LDA	Aggregated	40	GAS	3141914	267.2178	0.00357	0.005915
RIVERSIDE	LDA	Aggregated	41	GAS		267.2501	0.003508	0.005889
RIVERSIDE	LDA	Aggregated	42	GAS		267.2824	0.003446	0.005863
RIVERSIDE	LDA	Aggregated	43	GAS		267.3148	0.003384	0.005838
RIVERSIDE	LDA	Aggregated	44	GAS		267.3471	0.003323	0.005812
RIVERSIDE	LDA	Aggregated	45	GAS	2646227	267.3794	0.003261	0.005787
RIVERSIDE	LDA	Aggregated	46	GAS		269.087	0.003244	0.005775
RIVERSIDE	LDA	Aggregated	47	GAS		270.7947	0.003228	0.005762
RIVERSIDE	LDA	Aggregated	48	GAS		272.5023	0.003211	0.00575
RIVERSIDE	LDA	Aggregated	49	GAS		274.2099	0.003194	0.005738
RIVERSIDE	LDA	Aggregated	50	GAS	3128665	275.9176	0.003178	0.005726
RIVERSIDE	LDA	Aggregated	51	GAS		278.2921	0.003191	0.005732
RIVERSIDE	LDA	Aggregated	52	GAS		280.6667	0.003205	0.005738
RIVERSIDE	LDA	Aggregated	53	GAS		283.0412	0.003218	0.005743
RIVERSIDE	LDA	Aggregated	54	GAS		285.4158	0.003231	0.005749
RIVERSIDE	LDA	Aggregated	55	GAS	3043758	287.7903	0.003245	0.005755
RIVERSIDE	LDA	Aggregated	56	GAS		290.0092	0.003282	0.005772
RIVERSIDE	LDA	Aggregated	57	GAS		292.228	0.003319	0.005788
RIVERSIDE	LDA	Aggregated	58	GAS		294.4468	0.003357	0.005805
RIVERSIDE	LDA	Aggregated	59	GAS		296.6656	0.003394	0.005822
RIVERSIDE	LDA	Aggregated	60	GAS	3466749	298.8845	0.003431	0.005839
RIVERSIDE	LDA	Aggregated	61	GAS		299.8047	0.00351	0.005923
RIVERSIDE	LDA	Aggregated	62	GAS		300.725	0.003589	0.006008
RIVERSIDE	LDA	Aggregated	63	GAS		301.6452	0.003668	0.006092
RIVERSIDE	LDA	Aggregated	64	GAS		302.5655	0.003747	0.006176
RIVERSIDE	LDA	Aggregated	65	GAS	2875577	303.4857	0.003826	0.006261
RIVERSIDE	LDA	Aggregated	66	GAS		305.0731	0.003935	0.006326
RIVERSIDE	LDA	Aggregated	67	GAS		306.6605	0.004044	0.006392
RIVERSIDE	LDA	Aggregated	68	GAS		308.2478	0.004154	0.006457
RIVERSIDE	LDA	Aggregated	69	GAS		309.8352	0.004263	0.006523
RIVERSIDE	LDA	Aggregated	70	GAS	1374602	311.4226	0.004373	0.006588

Note: Emissions interpolated from EMFAC2017 5 mph output to provide every 1 mph data.

			IDLEX	
Region	Vehicle Category	Fuel	CO2	CH4
RIVERSIDE	HHDT	Dsl	6327.96	0.118762
RIVERSIDE	LHDT1	Gas	4735.473	2.534328

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: RIVERSIDE
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW

Region	Vehicle Category	Model Year	Speed	Fuel	VMT	CO2	RUNEX CH4	N2O
RIVERSIDE	HHDT	Aggregated	5	DSL	5873.584	3356.056	0.005945	0.527525
RIVERSIDE	HHDT	Aggregated	6	DSL		3296.428	0.005456	0.518153
RIVERSIDE	HHDT	Aggregated	7	DSL		3236.8	0.004966	0.50878
RIVERSIDE	HHDT	Aggregated	8	DSL		3177.171	0.004477	0.499407
RIVERSIDE	HHDT	Aggregated	9	DSL		3117.543	0.003988	0.490034
RIVERSIDE	HHDT	Aggregated	10	DSL	4013.783	3057.915	0.003498	0.480662
RIVERSIDE	HHDT	Aggregated	11	DSL		2887.226	0.003216	0.453832
RIVERSIDE	HHDT	Aggregated	12	DSL		2716.538	0.002933	0.427002
RIVERSIDE	HHDT	Aggregated	13	DSL		2545.85	0.00265	0.400172
RIVERSIDE	HHDT	Aggregated	14	DSL		2375.161	0.002367	0.373342
RIVERSIDE	HHDT	Aggregated	15	DSL	5749.703	2204.473	0.002085	0.346512
RIVERSIDE	HHDT	Aggregated	16	DSL		2134.488	0.001908	0.335512
RIVERSIDE	HHDT	Aggregated	17	DSL		2064.503	0.001732	0.324511
RIVERSIDE	HHDT	Aggregated	18	DSL		1994.518	0.001555	0.313511
RIVERSIDE	HHDT	Aggregated	19	DSL		1924.534	0.001379	0.30251
RIVERSIDE	HHDT	Aggregated	20	DSL	65638.04	1854.549	0.001202	0.291509
RIVERSIDE	HHDT	Aggregated	21	DSL		1795.47	0.001185	0.282223
RIVERSIDE	HHDT	Aggregated	22	DSL		1736.392	0.001167	0.272937
RIVERSIDE	HHDT	Aggregated	23	DSL		1677.313	0.001149	0.26365
RIVERSIDE	HHDT	Aggregated	24	DSL		1618.234	0.001131	0.254364
RIVERSIDE	HHDT	Aggregated	25	DSL	69485.3	1559.156	0.001113	0.245078
RIVERSIDE	HHDT	Aggregated	26	DSL		1521.3	0.001072	0.239127
RIVERSIDE	HHDT	Aggregated	27	DSL		1483.444	0.00103	0.233177
RIVERSIDE	HHDT	Aggregated	28	DSL		1445.589	0.000988	0.227226
RIVERSIDE	HHDT	Aggregated	29	DSL		1407.733	0.000946	0.221276
RIVERSIDE	HHDT	Aggregated	30	DSL	144757.4	1369.878	0.000905	0.215326
RIVERSIDE	HHDT	Aggregated	31	DSL		1342.346	0.000873	0.210998
RIVERSIDE	HHDT	Aggregated	32	DSL		1314.814	0.000841	0.20667
RIVERSIDE	HHDT	Aggregated	33	DSL		1287.282	0.000809	0.202343
RIVERSIDE	HHDT	Aggregated	34	DSL		1259.75	0.000777	0.198015
RIVERSIDE	HHDT	Aggregated	35	DSL	162844.7	1232.218	0.000745	0.193688
RIVERSIDE	HHDT	Aggregated	36	DSL		1209.835	0.000724	0.190169
RIVERSIDE	HHDT	Aggregated	37	DSL		1187.452	0.000702	0.186651
RIVERSIDE	HHDT	Aggregated	38	DSL		1165.07	0.000681	0.183133
RIVERSIDE	HHDT	Aggregated	39	DSL		1142.687	0.000659	0.179614
RIVERSIDE	HHDT	Aggregated	40	DSL	183220	1120.304	0.000638	0.176096
RIVERSIDE	HHDT	Aggregated	41	DSL		1107.239	0.000627	0.174043
RIVERSIDE	HHDT	Aggregated	42	DSL		1094.174	0.000616	0.171989
RIVERSIDE	HHDT	Aggregated	43	DSL		1081.109	0.000606	0.169935
RIVERSIDE	HHDT	Aggregated	44	DSL		1068.044	0.000595	0.167882
RIVERSIDE	HHDT	Aggregated	45	DSL	228442.2	1054.979	0.000584	0.165828
RIVERSIDE	HHDT	Aggregated	46	DSL		1053.127	0.000585	0.165537
RIVERSIDE	HHDT	Aggregated	47	DSL		1051.276	0.000586	0.165246
RIVERSIDE	HHDT	Aggregated	48	DSL		1049.425	0.000587	0.164955
RIVERSIDE	HHDT	Aggregated	49	DSL		1047.573	0.000588	0.164664
RIVERSIDE	HHDT	Aggregated	50	DSL	307415.8	1045.722	0.000589	0.164373
RIVERSIDE	HHDT	Aggregated	51	DSL		1050.615	0.0006	0.165142
RIVERSIDE	HHDT	Aggregated	52	DSL		1055.509	0.000611	0.165911
RIVERSIDE	HHDT	Aggregated	53	DSL		1060.402	0.000621	0.16668
RIVERSIDE	HHDT	Aggregated	54	DSL		1065.296	0.000632	0.16745
RIVERSIDE	HHDT	Aggregated	55	DSL	410086.9	1070.189	0.000643	0.168219
RIVERSIDE	HHDT	Aggregated	56	DSL		1085.641	0.000665	0.170648
RIVERSIDE	HHDT	Aggregated	57	DSL		1101.092	0.000686	0.173076
RIVERSIDE	HHDT	Aggregated	58	DSL		1116.544	0.000708	0.175505
RIVERSIDE	HHDT	Aggregated	59	DSL		1131.995	0.00073	0.177934
RIVERSIDE	HHDT	Aggregated	60	DSL	613655.8	1147.447	0.000752	0.180363
RIVERSIDE	HHDT	Aggregated	61	DSL		1169.081	0.000783	0.183763
RIVERSIDE	HHDT	Aggregated	62	DSL		1190.715	0.000814	0.187164
RIVERSIDE	HHDT	Aggregated	63	DSL		1212.349	0.000846	0.190564
RIVERSIDE	HHDT	Aggregated	64	DSL		1233.983	0.000877	0.193965
RIVERSIDE	HHDT	Aggregated	65	DSL	810540.5	1255.617	0.000909	0.197366
RIVERSIDE	HHDT	Aggregated	66	DSL		1248.955	0.000945	0.196318
RIVERSIDE	HHDT	Aggregated	67	DSL		1242.293	0.000981	0.195271
RIVERSIDE	HHDT	Aggregated	68	DSL		1235.63	0.001018	0.194224
RIVERSIDE	HHDT	Aggregated	69	DSL		1228.968	0.001054	0.193177
RIVERSIDE	HHDT	Aggregated	70	DSL	1125052	1222.306	0.001091	0.192129

RIVERSIDE	LDA	Aggregated	5	GAS	68089.45	593.1608	0.011636	0.006585
RIVERSIDE	LDA	Aggregated	6	GAS		571.497	0.010783	0.0064
RIVERSIDE	LDA	Aggregated	7	GAS		549.8332	0.00993	0.006215
RIVERSIDE	LDA	Aggregated	8	GAS		528.1694	0.009077	0.006029
RIVERSIDE	LDA	Aggregated	9	GAS		506.5056	0.008224	0.005844
RIVERSIDE	LDA	Aggregated	10	GAS	47920.54	484.8418	0.007371	0.005658
RIVERSIDE	LDA	Aggregated	11	GAS		466.3861	0.00687	0.005536
RIVERSIDE	LDA	Aggregated	12	GAS		447.9305	0.006368	0.005413
RIVERSIDE	LDA	Aggregated	13	GAS		429.4749	0.005867	0.00529
RIVERSIDE	LDA	Aggregated	14	GAS		411.0192	0.005365	0.005168
RIVERSIDE	LDA	Aggregated	15	GAS	103861.8	392.5636	0.004863	0.005045
RIVERSIDE	LDA	Aggregated	16	GAS		379.3667	0.004576	0.004941
RIVERSIDE	LDA	Aggregated	17	GAS		366.1699	0.004288	0.004836
RIVERSIDE	LDA	Aggregated	18	GAS		352.9731	0.004001	0.004732
RIVERSIDE	LDA	Aggregated	19	GAS		339.7762	0.003714	0.004628
RIVERSIDE	LDA	Aggregated	20	GAS	282690.4	326.5794	0.003426	0.004523
RIVERSIDE	LDA	Aggregated	21	GAS		317.0167	0.003248	0.004445
RIVERSIDE	LDA	Aggregated	22	GAS		307.4541	0.00307	0.004366
RIVERSIDE	LDA	Aggregated	23	GAS		297.8915	0.002891	0.004288
RIVERSIDE	LDA	Aggregated	24	GAS		288.3288	0.002713	0.004209
RIVERSIDE	LDA	Aggregated	25	GAS	1780594	278.7662	0.002535	0.004131
RIVERSIDE	LDA	Aggregated	26	GAS		272.5322	0.002425	0.004071
RIVERSIDE	LDA	Aggregated	27	GAS		266.2982	0.002316	0.004011
RIVERSIDE	LDA	Aggregated	28	GAS		260.0642	0.002206	0.003951
RIVERSIDE	LDA	Aggregated	29	GAS		253.8303	0.002096	0.00389
RIVERSIDE	LDA	Aggregated	30	GAS	3668632	247.5963	0.001987	0.00383
RIVERSIDE	LDA	Aggregated	31	GAS		243.9087	0.001915	0.003785
RIVERSIDE	LDA	Aggregated	32	GAS		240.2211	0.001843	0.003739
RIVERSIDE	LDA	Aggregated	33	GAS		236.5336	0.001772	0.003693
RIVERSIDE	LDA	Aggregated	34	GAS		232.846	0.0017	0.003647
RIVERSIDE	LDA	Aggregated	35	GAS	3987166	229.1584	0.001629	0.003602
RIVERSIDE	LDA	Aggregated	36	GAS		227.7091	0.001586	0.003572
RIVERSIDE	LDA	Aggregated	37	GAS		226.2598	0.001544	0.003543
RIVERSIDE	LDA	Aggregated	38	GAS		224.8104	0.001502	0.003513
RIVERSIDE	LDA	Aggregated	39	GAS		223.3611	0.001459	0.003484
RIVERSIDE	LDA	Aggregated	40	GAS	3455407	221.9118	0.001417	0.003454
RIVERSIDE	LDA	Aggregated	41	GAS		222.0467	0.001394	0.003439
RIVERSIDE	LDA	Aggregated	42	GAS		222.1815	0.00137	0.003424
RIVERSIDE	LDA	Aggregated	43	GAS		222.3164	0.001347	0.003409
RIVERSIDE	LDA	Aggregated	44	GAS		222.4512	0.001323	0.003394
RIVERSIDE	LDA	Aggregated	45	GAS	3090374	222.5861	0.0013	0.003379
RIVERSIDE	LDA	Aggregated	46	GAS		223.8722	0.00129	0.003368
RIVERSIDE	LDA	Aggregated	47	GAS		225.1583	0.001281	0.003357
RIVERSIDE	LDA	Aggregated	48	GAS		226.4444	0.001271	0.003346
RIVERSIDE	LDA	Aggregated	49	GAS		227.7305	0.001262	0.003335
RIVERSIDE	LDA	Aggregated	50	GAS	3587085	229.0166	0.001252	0.003325
RIVERSIDE	LDA	Aggregated	51	GAS		230.9161	0.001256	0.003328
RIVERSIDE	LDA	Aggregated	52	GAS		232.8157	0.001261	0.003331
RIVERSIDE	LDA	Aggregated	53	GAS		234.7152	0.001265	0.003335
RIVERSIDE	LDA	Aggregated	54	GAS		236.6148	0.001269	0.003338
RIVERSIDE	LDA	Aggregated	55	GAS	3165825	238.5143	0.001274	0.003342
RIVERSIDE	LDA	Aggregated	56	GAS		240.5311	0.001292	0.003351
RIVERSIDE	LDA	Aggregated	57	GAS		242.5479	0.00131	0.003359
RIVERSIDE	LDA	Aggregated	58	GAS		244.5647	0.001328	0.003368
RIVERSIDE	LDA	Aggregated	59	GAS		246.5815	0.001346	0.003377
RIVERSIDE	LDA	Aggregated	60	GAS	4129878	248.5983	0.001364	0.003385
RIVERSIDE	LDA	Aggregated	61	GAS		249.1243	0.001391	0.003433
RIVERSIDE	LDA	Aggregated	62	GAS		249.6503	0.001418	0.00348
RIVERSIDE	LDA	Aggregated	63	GAS		250.1764	0.001445	0.003528
RIVERSIDE	LDA	Aggregated	64	GAS		250.7024	0.001472	0.003575
RIVERSIDE	LDA	Aggregated	65	GAS	3064910	251.2284	0.001499	0.003623
RIVERSIDE	LDA	Aggregated	66	GAS		252.3904	0.001537	0.003651
RIVERSIDE	LDA	Aggregated	67	GAS		253.5525	0.001576	0.003679
RIVERSIDE	LDA	Aggregated	68	GAS		254.7145	0.001615	0.003707
RIVERSIDE	LDA	Aggregated	69	GAS		255.8765	0.001653	0.003736
RIVERSIDE	LDA	Aggregated	70	GAS	1193784	257.0385	0.001692	0.003764

Note: Emissions interpolated from EMFAC2017 5 mph output to provide every 1 mph data.

			IDLEX	
Region	Vehicle Category	Fuel	CO2	CH4
RIVERSIDE	HHDT	Dsl	5551.887	0.109884
RIVERSIDE	LHDT1	Gas	4503.772	2.234527

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: RIVERSIDE
Calendar Year: 2045
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW

							RUNEX	
Region	Vehicle Category	Model Year	Speed	Fuel	VMT	CO2	CH4	N2O
RIVERSIDE	HHDT	Aggregated	5	DSL	8291.595	2458.122	0.005651	0.386383
RIVERSIDE	HHDT	Aggregated	6	DSL		2372.317	0.005226	0.372895
RIVERSIDE	HHDT	Aggregated	7	DSL		2286.512	0.0048	0.359408
RIVERSIDE	HHDT	Aggregated	8	DSL		2200.707	0.004374	0.34592
RIVERSIDE	HHDT	Aggregated	9	DSL		2114.901	0.003948	0.332433
RIVERSIDE	HHDT	Aggregated	10	DSL	5956.587	2029.096	0.003522	0.318946
RIVERSIDE	HHDT	Aggregated	11	DSL		1941.037	0.003212	0.305104
RIVERSIDE	HHDT	Aggregated	12	DSL		1852.979	0.002901	0.291262
RIVERSIDE	HHDT	Aggregated	13	DSL		1764.92	0.00259	0.277421
RIVERSIDE	HHDT	Aggregated	14	DSL		1676.862	0.00228	0.263579
RIVERSIDE	HHDT	Aggregated	15	DSL	11792.26	1588.803	0.001969	0.249738
RIVERSIDE	HHDT	Aggregated	16	DSL		1564.992	0.001821	0.245995
RIVERSIDE	HHDT	Aggregated	17	DSL		1541.181	0.001673	0.242252
RIVERSIDE	HHDT	Aggregated	18	DSL		1517.37	0.001525	0.238509
RIVERSIDE	HHDT	Aggregated	19	DSL		1493.559	0.001377	0.234767
RIVERSIDE	HHDT	Aggregated	20	DSL	95787.16	1469.747	0.001229	0.231024
RIVERSIDE	HHDT	Aggregated	21	DSL		1411.567	0.001194	0.221879
RIVERSIDE	HHDT	Aggregated	22	DSL		1353.387	0.001158	0.212734
RIVERSIDE	HHDT	Aggregated	23	DSL		1295.207	0.001122	0.203589
RIVERSIDE	HHDT	Aggregated	24	DSL		1237.027	0.001086	0.194443
RIVERSIDE	HHDT	Aggregated	25	DSL	114343.8	1178.847	0.001051	0.185298
RIVERSIDE	HHDT	Aggregated	26	DSL		1151.112	0.001011	0.180939
RIVERSIDE	HHDT	Aggregated	27	DSL		1123.376	0.000971	0.176579
RIVERSIDE	HHDT	Aggregated	28	DSL		1095.641	0.000931	0.17222
RIVERSIDE	HHDT	Aggregated	29	DSL		1067.906	0.000891	0.16786
RIVERSIDE	HHDT	Aggregated	30	DSL	213744.7	1040.171	0.000851	0.1635
RIVERSIDE	HHDT	Aggregated	31	DSL		1018.688	0.000821	0.160124
RIVERSIDE	HHDT	Aggregated	32	DSL		997.2048	0.000791	0.156747
RIVERSIDE	HHDT	Aggregated	33	DSL		975.7218	0.000761	0.15337
RIVERSIDE	HHDT	Aggregated	34	DSL		954.2389	0.000731	0.149993
RIVERSIDE	HHDT	Aggregated	35	DSL	217896.5	932.7559	0.000701	0.146616
RIVERSIDE	HHDT	Aggregated	36	DSL		916.4805	0.000681	0.144058
RIVERSIDE	HHDT	Aggregated	37	DSL		900.2051	0.000661	0.1415
RIVERSIDE	HHDT	Aggregated	38	DSL		883.9297	0.000641	0.138941
RIVERSIDE	HHDT	Aggregated	39	DSL		867.6543	0.000621	0.136383
RIVERSIDE	HHDT	Aggregated	40	DSL	274240	851.3789	0.000601	0.133825
RIVERSIDE	HHDT	Aggregated	41	DSL		842.6867	0.000591	0.132459
RIVERSIDE	HHDT	Aggregated	42	DSL		833.9946	0.000582	0.131092
RIVERSIDE	HHDT	Aggregated	43	DSL		825.3025	0.000572	0.129726
RIVERSIDE	HHDT	Aggregated	44	DSL		816.6103	0.000563	0.12836
RIVERSIDE	HHDT	Aggregated	45	DSL	342447	807.9182	0.000553	0.126993
RIVERSIDE	HHDT	Aggregated	46	DSL		806.7347	0.000554	0.126807
RIVERSIDE	HHDT	Aggregated	47	DSL		805.5512	0.000555	0.126621
RIVERSIDE	HHDT	Aggregated	48	DSL		804.3678	0.000555	0.126435
RIVERSIDE	HHDT	Aggregated	49	DSL		803.1843	0.000556	0.126249
RIVERSIDE	HHDT	Aggregated	50	DSL	437610.6	802.0008	0.000557	0.126063
RIVERSIDE	HHDT	Aggregated	51	DSL		805.6504	0.000567	0.126637
RIVERSIDE	HHDT	Aggregated	52	DSL		809.3	0.000578	0.127211
RIVERSIDE	HHDT	Aggregated	53	DSL		812.9496	0.000588	0.127784
RIVERSIDE	HHDT	Aggregated	54	DSL		816.5992	0.000599	0.128358
RIVERSIDE	HHDT	Aggregated	55	DSL	630832.3	820.2487	0.000609	0.128932
RIVERSIDE	HHDT	Aggregated	56	DSL		832.9823	0.000631	0.130933
RIVERSIDE	HHDT	Aggregated	57	DSL		845.7158	0.000652	0.132935
RIVERSIDE	HHDT	Aggregated	58	DSL		858.4494	0.000673	0.134936
RIVERSIDE	HHDT	Aggregated	59	DSL		871.1829	0.000695	0.136938
RIVERSIDE	HHDT	Aggregated	60	DSL	685363	883.9165	0.000716	0.138939
RIVERSIDE	HHDT	Aggregated	61	DSL		899.448	0.000746	0.141381
RIVERSIDE	HHDT	Aggregated	62	DSL		914.9796	0.000777	0.143822
RIVERSIDE	HHDT	Aggregated	63	DSL		930.5112	0.000807	0.146263
RIVERSIDE	HHDT	Aggregated	64	DSL		946.0428	0.000838	0.148705
RIVERSIDE	HHDT	Aggregated	65	DSL	1119086	961.5743	0.000868	0.151146
RIVERSIDE	HHDT	Aggregated	66	DSL		958.4285	0.000909	0.150652
RIVERSIDE	HHDT	Aggregated	67	DSL		955.2826	0.00095	0.150157
RIVERSIDE	HHDT	Aggregated	68	DSL		952.1368	0.000991	0.149663
RIVERSIDE	HHDT	Aggregated	69	DSL		948.991	0.001032	0.149168
RIVERSIDE	HHDT	Aggregated	70	DSL	1291195	945.8451	0.001073	0.148674

RIVERSIDE	LDA	Aggregated	5	GAS	97559.87	475.8376	0.004422	0.005252
RIVERSIDE	LDA	Aggregated	6	GAS		458.692	0.004095	0.005106
RIVERSIDE	LDA	Aggregated	7	GAS		441.5464	0.003769	0.00496
RIVERSIDE	LDA	Aggregated	8	GAS		424.4008	0.003443	0.004814
RIVERSIDE	LDA	Aggregated	9	GAS		407.2552	0.003117	0.004669
RIVERSIDE	LDA	Aggregated	10	GAS	77039.73	390.1096	0.00279	0.004523
RIVERSIDE	LDA	Aggregated	11	GAS		375.1989	0.002599	0.004427
RIVERSIDE	LDA	Aggregated	12	GAS		360.2882	0.002408	0.004331
RIVERSIDE	LDA	Aggregated	13	GAS		345.3774	0.002217	0.004235
RIVERSIDE	LDA	Aggregated	14	GAS		330.4667	0.002026	0.00414
RIVERSIDE	LDA	Aggregated	15	GAS	159113.3	315.556	0.001835	0.004044
RIVERSIDE	LDA	Aggregated	16	GAS		304.9864	0.001726	0.003959
RIVERSIDE	LDA	Aggregated	17	GAS		294.4167	0.001618	0.003874
RIVERSIDE	LDA	Aggregated	18	GAS		283.8471	0.001509	0.003789
RIVERSIDE	LDA	Aggregated	19	GAS		273.2774	0.0014	0.003704
RIVERSIDE	LDA	Aggregated	20	GAS	445195.3	262.7078	0.001291	0.003619
RIVERSIDE	LDA	Aggregated	21	GAS		254.8439	0.001223	0.003559
RIVERSIDE	LDA	Aggregated	22	GAS		246.98	0.001155	0.003499
RIVERSIDE	LDA	Aggregated	23	GAS		239.1161	0.001086	0.003439
RIVERSIDE	LDA	Aggregated	24	GAS		231.2522	0.001018	0.003379
RIVERSIDE	LDA	Aggregated	25	GAS	2337236	223.3883	0.00095	0.003319
RIVERSIDE	LDA	Aggregated	26	GAS		218.3222	0.000908	0.003271
RIVERSIDE	LDA	Aggregated	27	GAS		213.2562	0.000866	0.003224
RIVERSIDE	LDA	Aggregated	28	GAS		208.1901	0.000824	0.003176
RIVERSIDE	LDA	Aggregated	29	GAS		203.124	0.000783	0.003129
RIVERSIDE	LDA	Aggregated	30	GAS	4585222	198.058	0.000741	0.003081
RIVERSIDE	LDA	Aggregated	31	GAS		195.1342	0.000714	0.003044
RIVERSIDE	LDA	Aggregated	32	GAS		192.2104	0.000688	0.003008
RIVERSIDE	LDA	Aggregated	33	GAS		189.2865	0.000661	0.002971
RIVERSIDE	LDA	Aggregated	34	GAS		186.3627	0.000635	0.002934
RIVERSIDE	LDA	Aggregated	35	GAS	4759100	183.4389	0.000608	0.002898
RIVERSIDE	LDA	Aggregated	36	GAS		182.2751	0.000592	0.002874
RIVERSIDE	LDA	Aggregated	37	GAS		181.1112	0.000576	0.002851
RIVERSIDE	LDA	Aggregated	38	GAS		179.9474	0.00056	0.002827
RIVERSIDE	LDA	Aggregated	39	GAS		178.7835	0.000544	0.002804
RIVERSIDE	LDA	Aggregated	40	GAS	4216964	177.6196	0.000528	0.002781
RIVERSIDE	LDA	Aggregated	41	GAS		177.715	0.000519	0.002767
RIVERSIDE	LDA	Aggregated	42	GAS		177.8103	0.00051	0.002753
RIVERSIDE	LDA	Aggregated	43	GAS		177.9056	0.000501	0.002739
RIVERSIDE	LDA	Aggregated	44	GAS		178.0009	0.000492	0.002725
RIVERSIDE	LDA	Aggregated	45	GAS	4099218	178.0962	0.000483	0.002711
RIVERSIDE	LDA	Aggregated	46	GAS		178.991	0.00048	0.002705
RIVERSIDE	LDA	Aggregated	47	GAS		179.8859	0.000476	0.002699
RIVERSIDE	LDA	Aggregated	48	GAS		180.7808	0.000472	0.002693
RIVERSIDE	LDA	Aggregated	49	GAS		181.6756	0.000469	0.002687
RIVERSIDE	LDA	Aggregated	50	GAS	4324958	182.5705	0.000465	0.002681
RIVERSIDE	LDA	Aggregated	51	GAS		184.3179	0.000467	0.00268
RIVERSIDE	LDA	Aggregated	52	GAS		186.0652	0.00047	0.002679
RIVERSIDE	LDA	Aggregated	53	GAS		187.8126	0.000472	0.002677
RIVERSIDE	LDA	Aggregated	54	GAS		189.5599	0.000475	0.002676
RIVERSIDE	LDA	Aggregated	55	GAS	3971136	191.3073	0.000477	0.002674
RIVERSIDE	LDA	Aggregated	56	GAS		192.612	0.000484	0.002685
RIVERSIDE	LDA	Aggregated	57	GAS		193.9167	0.000491	0.002696
RIVERSIDE	LDA	Aggregated	58	GAS		195.2214	0.000497	0.002707
RIVERSIDE	LDA	Aggregated	59	GAS		196.5262	0.000504	0.002718
RIVERSIDE	LDA	Aggregated	60	GAS	4139858	197.8309	0.00051	0.002729
RIVERSIDE	LDA	Aggregated	61	GAS		198.4702	0.000521	0.002761
RIVERSIDE	LDA	Aggregated	62	GAS		199.1094	0.000531	0.002793
RIVERSIDE	LDA	Aggregated	63	GAS		199.7487	0.000542	0.002825
RIVERSIDE	LDA	Aggregated	64	GAS		200.388	0.000553	0.002857
RIVERSIDE	LDA	Aggregated	65	GAS	3495024	201.0272	0.000563	0.00289
RIVERSIDE	LDA	Aggregated	66	GAS		201.8847	0.000576	0.002913
RIVERSIDE	LDA	Aggregated	67	GAS		202.7423	0.000589	0.002937
RIVERSIDE	LDA	Aggregated	68	GAS		203.5998	0.000601	0.00296
RIVERSIDE	LDA	Aggregated	69	GAS		204.4573	0.000614	0.002984
RIVERSIDE	LDA	Aggregated	70	GAS	1222448	205.3148	0.000627	0.003007

Note: Emissions interpolated from EMFAC2017 5 mph output to provide every 1 mph data.

			IDLEX	
Region	Vehicle Category	Fuel	CO2	CH4
RIVERSIDE	HHDT	Dsl	4406.016	0.109962
RIVERSIDE	LHDT1	Gas	3718.33	1.565158