AIR QUALITY ASSESSMENT

Interstate 5 HOV Lane Extension Project

Interstate 5 (between Avenida Pico undercrossing and San Juan Creek Road undercrossing)

EA: 0F9600; RTP ID: 2H01143; RTIP ID: ORA080912
PM 3.0 to 8.7 (KP 4.8 to 14.0)

Cities of San Juan Capistrano, Dana Point, and San Clemente
County of Orange, State of California

CALTRANS DISTRICT 12

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July 1, 2010

JN 10-106626

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ADT	Average Daily Traffic
AADT	Annual Average Daily Traffic
Basin	South Coast Air Basin
BT&H	Business, Transportation & Housing Agency
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality
CO	carbon monoxide
DPM	Diesel Particulate Matter
DRRP	Diesel Risk Reduction Plan
EPA	Environmental Protection Agency
EMFAC	Emissions Factor Model
CT-EMFAC	Caltrans (version) Emissions Factor Model
FCAA	Federal Clean Air Act
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FY	fiscal year
GHG	greenhouse gas
HOV	high-occupancy vehicle
I/M	inspection and maintenance
I-5	Interstate 5
IPCC	Intergovernmental Panel on Climate Change
IRIS	Integrated Risk Information System
ITS	Intelligent Transportation Systems
KP	Kilo Post
LOS	level of service
mph	miles per hour
MSAT	Mobile Source Air Toxic
MPO	Metropolitan Planning Organization
NCHRP	National Cooperative Highway Research Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NLEV	national low emission vehicle
NO_2	nitrogen dioxide
OCTA	Orange County Transportation Authority

ACRONYMS AND ABBREVIATIONS (Continued)

O_3	ozone
PCH	Pacific Coast Highway
PA/ED	Project Approval/Environmental Document
ppm	parts per million
Pb	lead
PM	Post Mile
PM_{10}	particulate matter
$PM_{2.5}$	fine particulate matter
POAQC	project of air quality concern
RFG	reformulated gasoline
ROG	Reactive Organic Gases
ROD	Record of Decision
ROW	right-of-way
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SB	Senate Bill
SIP	State Implementation Plan
SO_2	sulfur dioxide
STIP	State Transportation Improvement Program
TCIF	Trade Corridors Improvement Fund
TCWG	Transportation Conformity Working Group
TIP	Transportation Improvement Plan
TEA-21	Transportation Equity Act for the 21st Century
TSP	Total Suspended Particulates
UC	undercrossing
USC	United States Code
USGS	United States Geological Survey
$\mu g/m^3$	micrograms per cubic meter
UV	ultraviolet
UV-B	ultraviolet rays
VHT	vehicle hours traveled
VMT	vehicle miles traveled
VOC	Volatile Organic Compounds

EXECUTIVE SUMMARY

The Orange County Transportation Authority (OCTA) and California Department of Transportation (Caltrans) propose improvements on Interstate 5 (I-5) between 0.4 mile south of the Avenida Pico undercrossing (Post Mile [PM] 3.0) and 0.1 mile south of the San Juan Creek Road undercrossing (PM 8.7) in the cities of San Clemente, Dana Point, and San Juan Capistrano, County of Orange, State of California. Five local arterial interchanges are within the project limits: Avenida Pico; Avenida Vista Hermosa; Camino de Estrella; Camino Las Ramblas/Pacific Coast Highway (PCH); and Camino Capistrano/San Juan Creek Road. The project proposes to extend the high-occupancy vehicle (HOV) lanes in both directions on I-5 within the project limits. Additionally, the project proposes the construction of auxiliary lanes at various locations and the improvements of several existing on- and off-ramps to address the traffic demand and improve operations. There are three proposed Build Alternatives, costing more than $100 million, in addition to the No Build Alternative. As such, Title 23, Section 106(h) of the Federal Highway Administration (FHWA) Major Project Guidance, requires recipients of federal financial assistance for projects with a total cost of between $100 million and up to $500 million to develop an annual financial plan.

Short-term impacts to air quality would occur during grading, pavement application, and the restriping phase. Project construction would be less than five years, and is anticipated to commence in 2015 and be completed by 2019. All construction vehicles and equipment would be required to be equipped with the State-mandated emission control devices pursuant to State emission regulations and standard construction practices. After construction of the proposed project is complete, all construction-related impacts would cease, thus resulting in a less than significant impact. Short-term construction particulate matter emissions would be further reduced with the implementation of required dust suppression measures outlined within the South Coast Air Quality Management District Rule 402 and 403. Caltrans Standard Specifications for Construction (Section 10 and 18 [Dust Control] and Section 39-3.06 [Asphalt Concrete Plants]) would also be adhered to. Therefore, project construction would not violate State or Federal air quality standards or contribute to the existing air quality violations in the South Coast Air Basin.

The proposed project is located within Caltrans District 12, which is Federally designated nonattainment for PM_{10} and $PM_{2.5}$. According to the U.S. Environmental Protection Agency's March 10, 2006 final rule, the *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas* (2006 Guidelines), the proposed project would not be considered a project of air quality concern (POAQC) under 40 CFR 93.123(b)(1). Although the mainline traffic volumes are relatively high, this segment of I-5 does not have a high percentage of truck traffic. It is four percent or less under existing conditions and would remain the same under build conditions. It should be noted that there are no ports, railyards, or other sources of heavy truck traffic in the study area. The proposed project was submitted to stakeholders at a Transportation Conformity Working Group meeting on February 23, 2010, pursuant to the interagency consultation requirement of 40 CFR 93.105 (c)(1)(i). The members of the Transportation Conformity Working Group confirmed that the proposed project would not be considered a POAQC. Therefore, the proposed project would be considered exempt under 40 CFR 93.126, as it would not create a new, or worsen an existing, $PM_{2.5}$ or PM_{10} violation.

A carbon monoxide (CO) hot-spot analysis was performed per the 1997 *Transportation Project-Level Carbon Monoxide Protocol* (CO Protocol) developed by the Institute of Transportation Studies at the University of California, Davis (UC Davis). The analysis concluded that implementation of the proposed project would alleviate several peak-hour mainline and freeway ramp deficiencies and would reduce congestion. The proposed project involves the extension of HOV lanes that would reduce conflicts and enhance vehicular traffic and circulation. Additionally, the proposed project does not involve parking

lots, and therefore would not increase the number of vehicles operating in cold start mode. As a result, the proposed project has sufficiently addressed the CO impact and no further analysis is needed.

The proposed project is included in the Southern California Association of Governments *2008 Regional Transportation Plan* (RTP ID 2H01143), and the adopted *2008 Regional Transportation Improvement Program* (RTIP ID ORA990929). The 2008 RTP was found by the Federal Highway Administration and Federal Transit Administration to conform to the State Implementation Plan (SIP) on June 15, 2008, and the 2008 RTIP was found conforming on November 17, 2008. The proposed project's RTIP listing is included in the adopted 2008 RTIP. The build alternatives would enhance vehicular traffic and circulation. The proposed project is not expected to result in the redistribution of traffic and impacts on other facilities are not anticipated.

The National Environmental Policy Act (NEPA) action for the proposed project is an Environmental Assessment/Finding of No Significant Impact (EA/FONSI). A quantitative Mobile Source Air Toxic (MSAT) analysis determined that the proposed project would result in minimal air quality impacts in regards to Diesel Particulate Matter and MSAT emissions. The analysis compared no build with build conditions and determined that MSAT emissions would not vary significantly. Implementation of the standard construction practices would ensure that air quality impacts from construction-related sources would be less than significant. There would be no significant impacts arising from the proposed project's operational condition.

A quantitative greenhouse gas emissions analysis determined that an increase in vehicle miles traveled (VMT) would occur within the HOV lanes, while the freeways, toll roads, ramps, and arterials would experience a VMT decrease. As a result, the proposed project build conditions would result in a reduction in vehicle hours traveled (VHT) and the improved traffic flow would reduce greenhouse gas emissions. Additionally, based on the year 2040 No Build VMT data, GHG emissions would result in 4,704.95 metric tons of carbon dioxide equivalents per year ($MTCO_2$/yr), while emissions based on 2040 Build VMT data would result in 4,705.58 $MTCO_2$/yr. Although 2040 Build conditions would result in a net increase of 0.63 $MTCO_2$/yr over No Build conditions, it should be noted that the CT-EMFAC model run does not account for the improved traffic flow conditions that would occur under 2040 Build conditions. The proposed project would provide continuity of the I-5 mainline HOV network and maximize overall performance within the project limits, which would reduce emissions. Extending the HOV lane would maintain travel speeds and minimize weaving conflicts that occur at the termini of the HOV lanes. Also, when considering further emissions improvements under AB 1493, CO_2 emissions for the Build conditions would most likely be less than the No Build conditions. Furthermore, there are no significant cumulative air quality impacts associated with the proposed project. Thus, no mitigation measures are required for operational emissions.

The project is proposed to be state funded through the regional State Transportation Improvement Program (STIP) and through the "Local Measure M Reauthorization" initiative. Additionally, the proposed project would also be federally funded through the FHWA Congestion Mitigation and Air Quality (CMAQ) program and is considered to be a full oversight under the current FHWA-Department of Transportation Stewardship and Oversight Agreements executed on September 4, 2007. The CMAQ program funds transportation projects to improve air quality and reduce traffic congestion in areas that do not meet air quality standards.

1.0 INTRODUCTION

The purpose of this Air Quality Assessment is to evaluate potential short-term and long-term air quality impacts resulting from implementation of the proposed Interstate 5 (I-5) High Occupancy Vehicle (HOV) Lane Extension project. Data utilized in this analysis was obtained from the *Project Study Report*, prepared by the Orange County Transportation Authority (OCTA) and the California Department of Transportation (Caltrans), dated February 2009; the *I-5 HOV Lane Extension PA/ED Traffic Study*, prepared by Austin-Foust Associates, Inc., dated December 4, 2009; and the *Traffic Analysis, I-5 HOV Extension Project*, prepared by Caltrans, undated.

1.1 PROJECT LOCATION

The proposed project is located between the cities of San Juan Capistrano and San Clemente within the County of Orange, State of California; refer to Exhibit 1 (Regional Vicinity). The proposed project's boundaries are from Post Mile (PM) 3.0 to PM 8.7. The total distance of the proposed project is approximately 5.7 miles.

1.2 PROJECT DESCRIPTION

OCTA, in cooperation with Caltrans, the City of Dana Point, the City of San Clemente, and the City of San Juan Capistrano, is proposing to widen I-5 between Avenida Pico and San Juan Creek Road; refer to Exhibits 2a and 2b (Site Plan). The proposed project is designed to achieve the following objectives are to provide continuity of the I-5 mainline HOV network within the project limits; maximize overall performance within the project limits by minimizing weaving conflicts at the termini of the HOV lanes; maintain travel speeds for HOV lane users; provide intermittent auxiliary lanes, where needed, to relieve congestion at diverge and merge locations; minimize right-of-way acquisition; relieve congestion within interchange areas, on- and off-ramps, and local intersections; and reduce congestion on I-5 within the project limits. The proposed project limits on I-5 extend from 0.4 mile south of the Avenida Pico Undercrossing (UC) (PM 3.0) to 0.1 mile south of the San Juan Creek Road UC (PM 8.7). The proposed project would add one HOV lane in each direction on I-5 throughout the project limits, reestablish existing auxiliary lanes and construct new auxiliary lanes, and improve several existing on- and off-ramps.

Four alternatives, including the No Build Alternative, will be analyzed as part of the Draft Initial Study/Environmental Assessment (IS/EA). The proposed project alternatives are described below.

Alternative 1 (No Build)

The No Build Alternative proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits in the northbound and southbound directions. All freeway facilities would remain as-is, with the exception of proposed projects that are under development or currently in construction.

Alternative 2

Auxiliary Lanes. Alternative 2 proposes to remove the existing I-5 paved shoulders and construct a new travel way and new shoulder pavement to the outside of the northbound and southbound lanes to accommodate HOV lanes. This alternative proposes full standard widths, including a 10-foot inside shoulder, 12-foot HOV lane, 4-foot buffer, four 12-foot general purpose lanes, and a 10-foot outside shoulder throughout the majority of the project limits. Additionally, existing auxiliary lanes through the project limits are proposed to be reestablished, and new auxiliary lanes would be constructed at the following locations (at the specified lengths):

SOURCE: USGS 7.5' QUAD - Dana Point (75); San Clemente (75)

Project Location

0 3000'
APPROXIMATE

I-5 HOV LANE EXTENSION PROJECT
AIR QUALITY ASSESSMENT

Regional Vicinity

2/3/10JN 10-106626-16417 MAS

Exhibit 1

not to scale

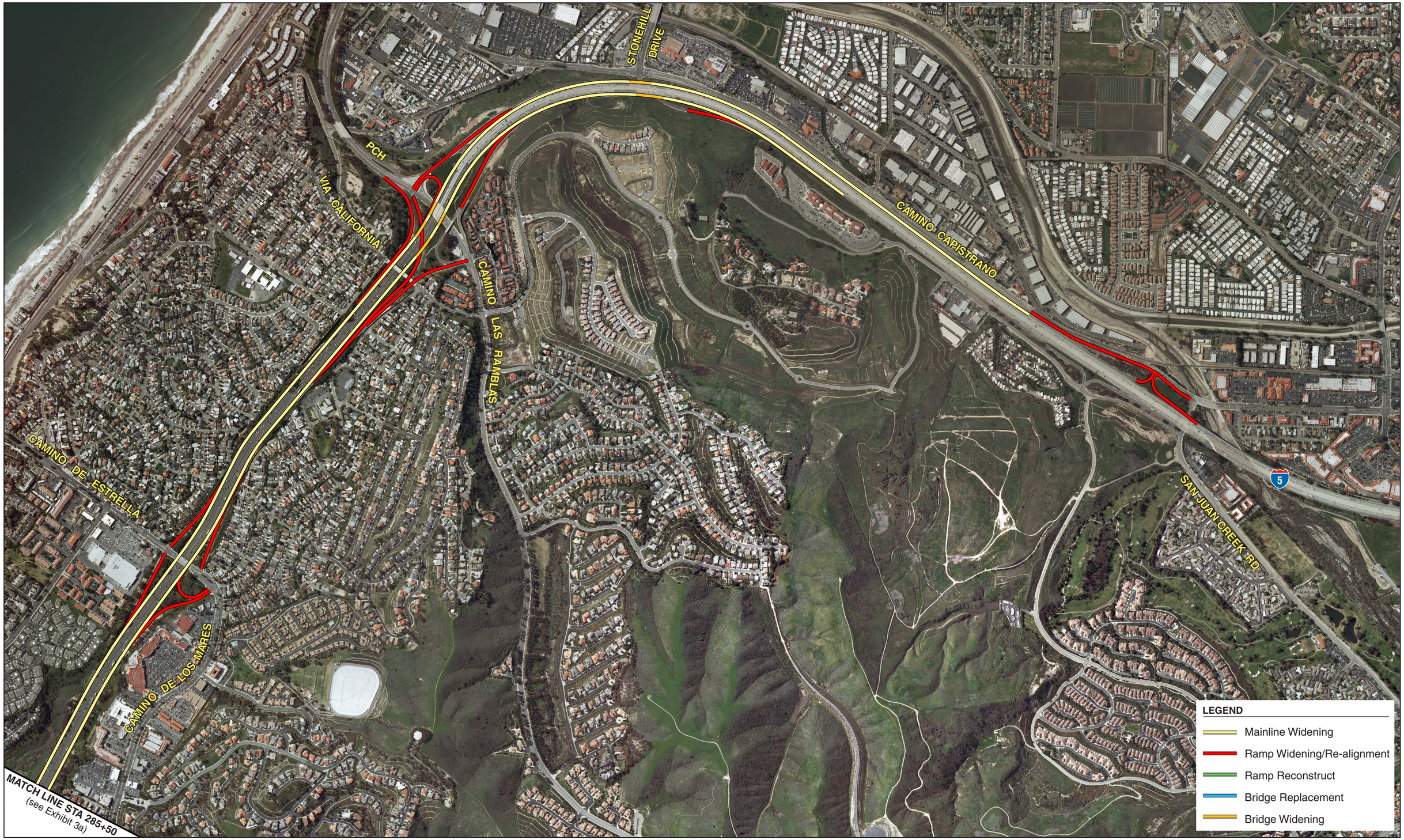
4/6/10 JN 10-106626-16417 MAS

I-5 HOV LANE EXTENSION PROJECT
AIR QUALITY ASSESSMENT

Site Plan

Exhibit 2a

Back of 11 X 17



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I-5 HOV LANE EXTENSION PROJECT
AIR QUALITY ASSESSMENT

Site Plan

Exhibit 2b

Back of 11 X 17

- To Avenida Vista Hermosa southbound off-ramp (1,300 feet);
- From Avenida Vista Hermosa northbound on-ramp (1,600 feet); and
- From Camino de Estrella southbound on-ramp (1,600 feet).

Avenida Pico Interchange Improvements. In addition to providing an HOV lane through the I-5/Avenida Pico interchange, the interchange configuration would also be improved. There are two options under consideration for reconfiguration of the interchange, both of which require replacement of the Avenida Pico Overcrossing structure.

- *Design Option A – Modified Tight Diamond Interchange.* Under this option, the on- and off-ramps at Avenida Pico would be realigned and the northbound on-ramp would be widened to three lanes. The overall configuration of the interchange would be similar to the existing configuration. Additionally, Avenida Pico would be improved under the structure to provide dual left-turn lanes to both the northbound and southbound on-ramps. This alternative would incorporate an interconnect line to optimize signal timing and operations for the closely spaced intersections at the interchange. The geometry of Avenida Pico would also be improved on the east side of I-5 to remove the existing reversing curves. Bicycle lanes and standard outside shoulders would be provided throughout the majority of the interchange in both the eastbound and westbound directions. A sidewalk would be provided through the interchange in the eastbound direction. In the westbound direction, space would be provided to accommodate future construction of a 12-foot lane and sidewalk through the interchange.

- *Design Option B – Northbound Loop On-Ramp/Realigned Northbound Off-Ramp.* Under this option, a northbound loop on-ramp would be added to allow for the removal of the existing left-turn lane for traffic heading eastbound on Avenida Pico to access northbound I-5. (The existing directional on-ramp would remain in place for traffic heading westbound to access northbound I-5.) Additionally, the northbound off-ramp would be reconfigured around the loop resulting in a partial cloverleaf configuration. The southbound ramps would be realigned and the geometry of Avenida Pico would be improved as proposed in Design Option A. Dual left-turn lanes would be provided under the structure to the southbound on-ramp. Bicycle lanes and standard outside shoulders would be provided throughout the majority of the interchange in both the eastbound and westbound directions. A sidewalk would be provided through the interchange in the eastbound direction. In the westbound direction, space would be provided to accommodate future construction of a 12-foot lane and sidewalk through the interchange.

Ramps. All ramps within the project limits would be modified in order to accommodate the HOV lanes, which would include improvements ranging from restriping to complete reconstruction. Specifically, ramp modifications under this alternative would include the following:

Avenida Pico

- Modify ramps as described in Design Options A and B above.

Avenida Vista Hermosa

- Restripe the northbound and southbound loop on-ramps; and
- Restripe the northbound on- and off-ramps and southbound off-ramp.

Camino de Estrella

- Realign, reconstruct, and widen the southbound off-ramp to a two-lane ramp;
- Realign and reconstruct the northbound and southbound on-ramps and northbound loop on-ramp; and
- Realign the northbound off-ramp.

Camino Las Ramblas/Pacific Coast Highway (PCH)

- Realign, reconstruct, and widen the southbound on-ramp to a two-lane ramp;
- Realign and reconstruct the southbound loop on-ramp;
- Realign the southbound off-ramp and northbound on- and off-ramps; and
- Realign the northbound I-5 connector.

Camino Capistrano (Stonehill Drive)

- Realign and reconstruct the northbound on-ramp.

Structures.

Via California

- Reduced shoulder widths are proposed under the Via California structure in order to avoid replacement of the existing Via California Overcrossing (Bridge No. 55-225). The inside shoulder would be reduced to approximately four feet at the minimum location and the HOV buffer would be eliminated in the northbound direction.

Avenida Pico

- This alternative also proposes to replace the Avenida Pico UC structure (Bridge No. 55-205) to accommodate the HOV lane in each direction through the interchange. In order to achieve minimum vertical clearance for this structure, the I-5 mainline profile would be raised through the interchange area. Additionally, to ensure that all existing mainline lanes are open through construction, the I-5 centerline would be realigned westerly approximately 20 feet through the interchange.

Avenida Vaquero UC (Bridge No. 55-223)

- Structure widening.

Northbound I-5 to northbound PCH Connector (Bridge No. 55-226)

- Structure widening.

Route 5/Camino Las Ramblas UC (Bridge No. 55-510)

- Structure widening.

Camino Capistrano UC (Stonehill Drive) (Bridge No. 55-227L and 55-227R)

- Structure widening.

Other Improvements. Alternative 2 proposes to improve the existing compound curve between 0.3 mile south of Stonehill Drive and Pacific Coast Highway (PCH). This alternative would provide a wide inside shoulder (26 feet at the maximum width) throughout the southern portion of the curve, along with increasing the radius from 2,000 to 2,200 feet to accommodate full standard stopping sight distance in the southbound direction. For the northern portion of the curve, the existing radius would be increased from 3,200 to 3,300 feet, with a 16-foot shoulder, in order to achieve a standard stopping sight distance through this portion of the compound curve. To accommodate the improvements to this compound curve, the median would be reconstructed.

Alternative 3

Alternative 3 is very similar in nature to Alternative 2. The differences are noted below:

Auxiliary Lanes. New auxiliary lanes would be constructed at the same locations as noted in Alternative 2.

Avenida Pico Interchange Improvements. Design options for the Avenida Pico interchange reconfiguration would be the same as those noted under Alternative 2.

Ramps. Ramp modifications would be the same as those noted under Alternative 2, with the exception that the Camino Capistrano (Stonehill Drive) ramp would not be impacted.

Structures. Modifications and improvements to structures are the same as those noted under Alternative 2 with the exception that I-5 northbound Camino Capistrano UC (Stonehill Drive) (Bridge No. 55-227R) would not be widened.

Other Improvements. Unlike Alternative 2, in Alternative 3, for the northern portion of the compound curve, the existing radius would not be changed and a two-foot median shoulder would be provided, resulting in a non-standard stopping sight distance. To accommodate the improvements to this compound curve, the median would be reconstructed.

Alternative 4

Alternative 4 includes many of the improvements common to Alternatives 2 and 3, with a few modifications. Alternative 4 proposes no buffer instead of the four-foot buffer proposed in Alternatives 2 and 3. Under the no buffer scenario, the HOV lane would accommodate continuous access throughout the project limits.

Auxiliary Lanes. New auxiliary lanes would be constructed at the same locations as noted in Alternatives 2 and 3.

Avenida Pico Interchange Improvements. Design options for the Avenida Pico interchange reconfiguration would be the same as those noted under Alternatives 2 and 3.

Ramps. Ramp modifications would be the same as those noted under Alternative 3.

Structures. Modifications and improvements to structures are the same as those noted under Alternative 3.

Other Improvements. Unlike Alternatives 2 and 3, for the northern portion of the compound curve, the existing radius would not be changed and a standard 10-foot median shoulder would be provided, which would minimize impacts but result in a non-standard stopping sight distance condition. To accommodate the improvements to this compound curve, the median would be reconstructed.

1.3 PURPOSE AND NEED

Purpose

The purpose of the proposed project is to improve existing and future traffic operations on I-5 from San Juan Creek Road to Avenida Pico while minimizing environmental and economic impacts. The following

key issues represent general deficiencies of I-5 within the project limits, and the potential solutions/opportunities for improvements:

- Achieve higher person carrying capacity within the corridor by increasing the vehicle occupancy rate;
- Reduce pollution and improve air quality along this corridor;
- Promote ride sharing and the use of HOVs such as carpools, vanpools, and bus services;
- Provide another lane option allowing for more consistent and predictable travel times for carpools, vanpools, buses, transit services, and emergency vehicles during peak periods;
- Relieve congestion due to the merge and diverge points for successive on- and off-ramps in both directions;
- Reduce delay due to the existing HOV termini location;
- Improve the capacity of the on- and off-ramps within the project limits, where needed; and
- Relieve congestion between successive ramps at several interchanges.

The project objectives include the following:

- Provide continuity of the I-5 mainline HOV network within the project limits;
- Maximize overall performance within the project limits by minimizing weaving conflicts at the termini of the HOV lanes and maintaining travel speeds for HOV lane users;
- Provide intermittent auxiliary lanes, where needed, to relieve congestion at diverge and merge locations;
- Minimize right-of-way acquisition;
- Relieve local street congestion within interchange areas, on- and off-ramps, and local intersections; and
- Reduce congestion on I-5 within the project limits.

Need

Without this proposed project, the efficiency of the regional HOV system would be reduced because HOV traffic would be required to merge into mixed-flow traffic lanes. Delay in completion of this project would contribute to traffic congestion on I-5 within the cities of San Clemente, Dana Point, and San Juan Capistrano. The proposed project is needed to address:

- A high level of traffic during the weekdays as well as weekends/holidays through this section;
- Congestion due to the termination of the existing HOV lane in both directions;
- Delay due to weaving and merging of HOV at the current termini in both directions;
- Congestion at the on/off ramps due to high traffic demands at the ramps; and
- Congestion due to weaving and merging between the successive ramps at several interchanges.

2.0 REGULATORY FRAMEWORK

2.1 FEDERAL CLEAN AIR ACT

The Federal Clean Air Act (FCAA) (1977 amendments – 42 United States Code [USC] 7401 *et. seq*.) states that the Federal government is prohibited from engaging in, supporting, providing financial assistance for, licensing, permitting or approving any activity that does not conform to an applicable State Implementation Plan (SIP). Federal actions relating to transportation plans, programs, and projects developed, funded, or approved under 23 USC of the Federal Transit Act (40 USC 1601 *et. seq*.) are covered under separate regulations for transportation conformity.

In the 1990 FCAA amendments, the Environmental Protection Agency (EPA) included provisions requiring Federal agencies to ensure that actions undertaken in nonattainment or attainment-maintenance areas are consistent with applicable SIPs. The process of determining whether or not a Federal action is consistent with an applicable SIP is called conformity.

The General Conformity Rule applies only to Federal actions that result in emissions of "nonattainment or maintenance pollutants," or their precursors, in Federally designated nonattainment or maintenance areas. The General Conformity Rule establishes a process to demonstrate that Federal actions would be consistent with applicable SIPs and would not cause or contribute to new violations of the National Ambient Air Quality Standards (NAAQS), increase the frequency or severity of existing violations of the NAAQS, or delay the timely attainment of the NAAQS. The emissions thresholds that trigger requirements of the conformity rule for Federal actions emitting nonattainment or maintenance pollutants, or their precursors, are called *de minimus* levels. The general conformity *de minimus* thresholds are defined in 40 CFR 93.153(b). The General Conformity Rule does not apply to Federal actions in areas designated as nonattainment of only the California Ambient Air Quality Standards (CAAQS).

2.2 CALIFORNIA CLEAN AIR ACT

The California Air Resources Board (CARB) administers air quality policy in California. The CAAQS were established in 1969 pursuant to the Mulford-Carrell Act. These standards are generally more stringent and apply to more pollutants than the NAAQS (i.e., visibility reducing particulates, hydrogen sulfide, and sulfates). The California Clean Air Act (CCAA), which was approved in 1988, requires that each local air district prepare and maintain an air quality management plan (AQMP) to achieve compliance with CAAQS. These AQMP's also serve as the basis for preparation of the SIP for the State of California.

CARB also administers the State's mobile source emissions control program and oversees air quality programs established by State statute, such as Assembly Bill (AB) 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987.

2.3 CALIFORNIA STATE IMPLEMENTATION PLAN

The 1990 amendments to the FCAA set new deadlines for attainment based on the severity of the pollution problem and launched a comprehensive planning process for attaining the NAAQS. The promulgation of the national eight-hour ozone standard and the fine particulate matter ($PM_{2.5}$) standards in 1997 resulted in additional statewide air quality planning efforts. In response to new Federal regulations, SIPs also began to address ways to improve visibility in national parks and wilderness areas.

SIPs are not single documents, but rather a compilation of new and previously submitted plans, programs, district rules, State regulations, and Federal controls. Many of California's SIPs rely on the same core set of control strategies, including emission standards for cars and heavy trucks, fuel regulations, and limits on emissions from consumer products. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB then forwards SIP revisions to the EPA for approval and publication in the Federal Register. The Code of Federal Regulations Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items which are included in the California SIP.

2.4 SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

The *2007 Air Quality Management Plan for the South Coast Air Basin* (2007 AQMP), which was adopted in June 2007, proposes policies and measures to achieve federal and state standards for improved air quality in the South Coast Air Basin (Basin) and those portions of the Salton Sea Air Basin (formerly named the Southeast Desert Air Basin) that are under the South Coast Air Quality Management District's (SCAQMD's) jurisdiction. The AQMP relies on a multi-level partnership of governmental agencies at the federal, state, regional, and local level. These agencies (EPA, CARB, local governments, Southern California Association of Governments [SCAG], and the SCAQMD) are the primary agencies that implement the AQMP programs. The 2007 AQMP includes new information on key elements such as:

- Current air quality;
- Improved emission inventories;
- An overall control strategy comprised of: Stationary and Mobile Source Control Measures, SCAQMD, State and Federal Stationary and Mobile Source Control Measures, and the SCAG Regional Transportation Strategy and Control Measures;
- New attainment demonstration for $PM_{2.5}$ and ozone;
- Milestones to the Federal Reasonable Further Progress Plan; and
- Preliminary motor vehicle emission budgets for transportation conformity purposes.

3.0 ENVIRONMENTAL SETTING

The proposed project is located within the South Coast Air Basin (Basin). The Basin is characterized as having a "Mediterranean" climate (a semi-arid environment with mild winters, warm summers, and moderate rainfall). The Basin is a 6,600-square mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, in addition to the San Gorgonio Pass area of Riverside County. Its terrain and geographical location determine the distinctive climate of the Basin, as it is a coastal plain with connecting broad valleys and low hills.

The general region lies in the semi-permanent, high-pressure zone of the eastern Pacific. As a result, the climate is mild and tempered by cool sea breezes. The climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the Basin is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of pollutants throughout the Basin.

Climate

The average annual temperature varies little throughout the Basin, and averages about 75 degrees Fahrenheit. However, with a less pronounced oceanic influence, the eastern inland portions of the Basin show greater variability in annual minimum and maximum temperatures. All portions of the Basin have had recorded temperatures over 100 degrees in recent years. January is usually the coldest month at all locations, while July and August are usually the hottest months of the year. Although the Basin has a semi-arid climate, the air near the surface is moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by off-shore winds, the ocean effect is dominant. Periods with heavy fog are frequent; low stratus clouds, occasionally referred to as "high fog," are a characteristic climate feature. Annual average relative humidity is 70 percent at the coast and 57 percent in the eastern part of the Basin. Precipitation in the Basin is typically 9 to 14 inches annually and is rarely in the form of snow or hail due to typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the Basin.

Within the project vicinity, the Cities of San Juan Capistrano, Dana Point, and San Clemente experiences fairly mild weather, with temperatures typically ranging from 40 degrees Fahrenheit in the winter to 79 degrees Fahrenheit in the summer. On average, the warmest months are August and September with a mean temperature of approximately 79 degrees Fahrenheit. The coolest months are December and January with a mean average of 44 degrees Fahrenheit. The project vicinity experiences the greatest amount of precipitation in the month of February.1

Sunlight

The presence and intensity of sunlight are necessary prerequisites for the formation of photochemical smog. Under the influence of the ultraviolet radiation of sunlight, certain original, or "primary" pollutants

[1] The Weather Channel, Monthly Averages for San Juan Capistrano, Dana Point, and San Clemente, Accessed November 30, 2009.
http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0996?from=36hr_bottomnav_undeclared
http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0279?from=36hr_bottomnav_undeclared
http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0981?from=36hr_bottomnav_undeclared

(mainly reactive hydrocarbons and oxides of nitrogen) react to form "secondary" pollutants (primarily oxidants). Since this process is time dependent, secondary pollutants can be formed many miles downwind from the emission sources. Due to the prevailing daytime winds and time-delayed nature of photochemical smog, oxidant concentrations are highest in the inland areas of Southern California.

Temperature Inversions

Under ideal meteorological conditions and irrespective of topography, pollutants emitted into the air would be mixed and dispersed into the upper atmosphere. However, the Southern California region frequently experiences temperature inversions in which pollutants are trapped and accumulate close to the ground. The inversion, a layer of warm, dry air overlaying cool, moist marine air, is a normal condition in the southland. The cool, damp, and hazy sea air capped by coastal clouds is heavier than the warm, clear air that acts as a lid through which the marine layer cannot rise. The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above sea level, the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet, the terrain prevents the pollutants from entering the upper atmosphere, resulting in a settlement in the foothill communities. Below 1,200 feet, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the daylight hours. Mixing heights for inversions are lower in the summer and more persistent, being partly responsible for the high levels of ozone observed during summer months in the Basin. Smog in Southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods of time, allowing them to form secondary pollutants by reacting with sunlight. The Basin has a limited ability to disperse these pollutants due to low wind speeds.

The area in which the proposed I-5 HOV Lane Extension project is located offers clear skies and sunshine; however, it is still susceptible to air inversions. This traps a layer of stagnant air near the ground where it is further loaded with pollutants. These inversions cause haziness, which is caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces, and other sources.

3.1 AIR QUALITY MANAGEMENT

Pursuant to the FCAA, the EPA has established NAAQS for the following air pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively), and lead (Pb). These pollutants are referred to as criteria pollutants because numerical criteria have been established for each pollutant, which define acceptable levels of exposure. The EPA has revised the NAAQS several times since their original implementation and would continue to do so as the health effects of exposure to air pollution are better understood.

As previously stated, states with air quality that did not achieve the NAAQS were required to develop and maintain SIPs. These plans constitute a Federally enforceable definition of the State's approach (or "plan") and schedule for the attainment of the NAAQS. Air quality management areas were designated as "attainment," "nonattainment," or "unclassified" for individual pollutants depending on whether or not they achieve the applicable NAAQS and CAAQS for each pollutant. It is important to note that because the NAAQS and CAAQS differ in many cases, it is possible for an area to be designated attainment by the EPA (meets NAAQS) and nonattainment by CARB (does not meet CAAQS) for the same pollutant. The NAAQS and the CAAQS are summarized in Table 1 (National and California Ambient Air Quality Standards).

Table 1
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1 Hour	0.09 ppm (180 μg/m³)	Ultraviolet Photometry	--	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 μg/m³)		0.075 ppm (147 μg/m³)		
Respirable Particulate Matter (PM_{10})	24 Hour	50 μg/m³	Gravimetric or Beta Attenuation	150 μg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 μg/m³		--		
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No Separate State Standard		35 μg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 μg/m³	Gravimetric or Beta Attenuation	15.0 μg/m³		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m³)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m³)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m³)		35 ppm (40 mg/m³)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m³)		--	--	==
Nitrogen Dioxide (NO_2)[8]	Annual Arithmetic Mean	0.030 ppm (57 μg/m³)	Gas Phase Chemiluminescence	0.053 ppm (100 μg/m³)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 μg/m³)		0.100 ppm		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	--	Ultraviolet Fluorescence	0.030 ppm (80 μg/m³)	--	Spectrophotometry (Paraosaniline Method)
	24 Hour	0.04 ppm (105 μg/m³)		0.14 ppm (365 μg/m³)	--	
	3 Hour	--		--	0.5 ppm (1300 μg/m³)	
	1 Hour	0.25 ppm (655 μg/m³)		--	--	--
Lead[9] (Pb)	30 Day Average	1.5 μg/m³	Atomic Absorption	--	--	--
	Calendar Quarter	--		1.5 μg/m³	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average[10]	--		0.15 μg/m³		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer – visibility of ten miles or more (0.07 – 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 μg/m³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m³)	Ultraviolet Fluorescence			
Vinyl Chloride[9]	24 Hour	0.01 ppm (26 μg/m³)	Gas Chromatography			

1 California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter – PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All other 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 averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m³ is equal to or less than one. For $PM_{2.5}$, 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 U.S. EPA for further clarification and current federal 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 procedure which can be shown to the satisfaction of CARB 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 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 EPA.

8 To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

9 CARB 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.

10 National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Source: California Air Resources Board, February 16, 2010.

Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than is 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 sensitive receptors include residences, motels/hotels, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The total distance of the extension is approximately 5.4 miles. Sensitive receptors located near the proposed project segment include residential uses, motels, hotels, schools, parks, and church uses. Within the City of San Juan Capistrano, the project site is immediately surrounded by commercial uses. However, within the City of Dana Point and the City of San Clemente, the project site is surrounded by mostly residential uses.

Attainment Status

The Basin is an attainment area for CO, NO_2, and SO_2 for both State and Federal standards. The Basin is a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$ under both State and Federal standards; refer to Table 2 (South Coast Air Basin Air Quality Attainment Status).

Table 2
SOUTH COAST AIR BASIN AIR QUALITY ATTAINMENT STATUS

Pollutant	State	Federal
Carbon Monoxide (CO)	Attainment	Attainment/Maintenance
Ozone (O_3) (1-hour standard)	Extreme Nonattainment	Revoked June 2005
Ozone (O_3) (8-hour standard)	Unclassified	Severe 17 Nonattainment[1]
Nitrogen Dioxide (NO_2)	Attainment	Attainment/Maintenance
Sulfur Dioxide (SO_2)	Attainment	Attainment
Particulate Matter <10 microns (PM_{10})	Nonattainment	Serious Nonattainment[2]
Particulate Matter <2.5 microns ($PM_{2.5}$)	Nonattainment	Nonattainment[3]

Notes:
1. The SCAQMD has requested that the federal 8-hour ozone attainment status be changed to extreme with an attainment date of 2023.
2. The U.S. EPA eliminated the annual PM_{10} standard in its final rule revision in October 2006.
3. The $PM_{2.5}$ nonattainment designation is based on the 1997 standard. In 2006, the EPA revised the 24-hour standard. The 2006 new $PM_{2.5}$ standard of 35 $\mu g/m^3$ applies one year after the effective date of the new designation (April 2010).

Source: California Air Resources Board, *Area Designations*, accessed November 2009. (http://www.arb.ca.gov/desig/desig.htm); and
U.S. Environmental Protection Agency, *The Green Book Nonattainment Areas for Criteria Pollutants*, accessed November 2009. (http://www.epa.gov/air/oaqps/greenbk).

4.0 MONITORED AIR QUALITY

The SCAQMD operates several air quality monitoring stations within the Basin; refer to Table 3 (Local Air Quality Levels). The closest monitoring stations are located in the cities of Mission Viejo and Costa Mesa. Each monitoring station is located within a Source Receptor Area (SRA). The communities within an SRA are expected to have similar climatology and ambient air pollutant concentrations. The proposed project area is located within the cities of San Juan Capistrano, Dana Point, and San Clemente, which is located in SRA 21 (Capistrano Valley). Although there are no monitoring stations within SRA 21, the Mission Viejo Monitoring Station is located in SRA 19 and the Costa Mesa Monitoring Station is located in SRA 18. The monitoring stations usually measure pollutant concentrations ten feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The following air quality information briefly describes the various types of pollutants monitored within the vicinity of the project study area.

Table 3
LOCAL AIR QUALITY LEVELS

Pollutant	Primary Standard		Year	Maximum Concentration[1]	Number of Days State/Federal Std. Exceeded
	California	Federal			
Carbon Monoxide (CO) [2]	9.0 ppm for 8 hours	9.0 ppm for 8 hours	2007 2008 2009	2.16 ppm 1.10 1.00	0/0 0/0 0/0
Ozone (O_3) [2] (1-Hour)	0.09 ppm for 1 hour	N/A	2007 2008 2009	0.108 ppm 0.118 0.121	5/NA 9/NA 7/NA
Ozone (O_3) [2] (8-Hour)	0.07ppm for 8 hours	0.075 ppm for 8 hours	2007 2008 2009	0.090 ppm 0.104 0.095	10/5 25/15 14/10
Nitrogen Dioxide (NO_x) [3]	0.18 ppm for 1 hour	0.100 ppm	2007 2008 2009	0.074 ppm 0.081 0.065	0/NA 0/NA 0/NA
Sulfur Dioxide (SO_X) [3]	0.25 ppm for 1 hour	0.14 ppm for 24 hours or 0.03 ppm annual arithmetic mean	2007 2008 2009	0.004 ppm 0.003	N/A N/A N/A
Particulate Matter (PM_{10}) [2, 4, 5]	50 µg/m^3 for 24 hours	150 µg/m^3 for 24 hours	2007 2008 2009	74.0 µg/m^3 42.0 41.0	3/0 0/0 0/0
Fine Particulate Matter ($PM_{2.5}$) [2,5]	No Separate State Standard	35 µg/m^3 for 24 hours	2007 2008 2009	46.8 µg/m^3 31.9 39.2	NM/2 NM/0 NM/1

ppm = parts per million
µg/m^3 = micrograms per cubic meter
NM = Not Measured
PM_{10} = particulate matter 10 microns in diameter or less
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
NA = Not Applicable

Notes:
1. Maximum concentration is measured over the same period as the California Standard.
2. Measurements taken at the Mission Viejo Monitoring Station located at 26081 Via Pera, Mission Viejo, California.
3. Measurements taken at the Costa Mesa Monitoring Station located at 2850 Mesa Verde Drive, Costa Mesa, California.
4. PM_{10} exceedances are based on State thresholds established prior to amendments adopted on June 20, 2002.
5. PM_{10} and $PM_{2.5}$ exceedances are derived from the number of samples exceeded, not days.

Source: California Air Resources Board, *ADAM Air Quality Data Statistics*, http://www.arb.ca.gov/adam/welcome.html.

Carbon Monoxide (CO)

Carbon monoxide is a colorless and odorless gas. The automobile and other types of motor vehicles are the main source of this pollutant in the Basin. CO concentrations are generally higher along roadways, especially in the early mornings. The State and Federal standard for CO is 9.0 parts per million (ppm), averaged over eight hours. State and Federal standards were not exceeded between 2007 and 2009. The Basin is designated as an attainment/maintenance area for Federal and State CO standards.

Ozone (O_3)

Ozone, a colorless gas with a sharp odor, is one of a number of substances called photochemical oxidants (highly reactive secondary pollutant). These oxidants are formed when hydrocarbons, NO_X, and related compounds interact in the presence of ultraviolet sunlight. The State standard for O_3 is 0.09 ppm, averaged over one hour, and 0.07 ppm, averaged over eight hours. Both Federal and State standards designate the Basin as a nonattainment area. The Federal one-hour standard for O_3 was revoked as of June 5, 2005, and therefore no longer applies. The State one-hour standard was exceeded 21 times, while the Federal standard was not exceeded. The State eight-hour standard was exceeded 49 times, while the Federal standard was exceeded 30 times.

Nitrogen Dioxide (NO_2)

NO_2 is a reddish-brown gas with an odor similar to bleach and is the by-product of fuel combustion, which results from mobile and stationary sources. It has complex diurnal concentrations that are typically higher at night. The Basin has relatively low NO_2 concentrations, as very few monitoring stations have exceeded the State standard of 0.18 ppm (one hour) since 1988. The EPA has recently updated the one-hour federal standard for NO_X to 0.100 ppm. NO_2 is itself a regulated pollutant, but it also reacts with hydrocarbons in the presence of sunlight to form O_3 and other compounds that make up photochemical smog. NO_2 levels have not exceeded the State standard between 2007 and 2009. The Basin is designated as an attainment area for NO_2 for State and Federal standards.

Oxides of Sulfur (SO_x or Sulfur Dioxide [SO_2])

SO_2 is a colorless gas with a sharp, irritating odor and results from the combustion of sulfur-containing fossil fuels from mobile and stationary sources. Diurnal concentrations are complex, but are typically higher at night. The State standard for SO_2 is 0.25 ppm averaged over one-hour, and the Federal standard is 0.14 ppm averaged over 24 hours. The Basin is in attainment for SO_2, and it has not exceeded the State and Federal standards from 2007 through 2009.

Coarse Particulate Matter (PM_{10})

PM_{10} refers to suspended particulate matter which is smaller than 10 microns (or ten one-millionths) of a meter. PM_{10} arises from sources such as road dust, diesel soot, combustion products, construction operations, and dust storms. PM_{10} scatters light and significantly reduces visibility. In addition, these particulates penetrate in the lungs and can potentially damage the respiratory tract. On June 19, 2003, CARB adopted amendments to the statewide 24-hour particulate matter standards based upon requirements set forth in the Children's Environmental Health Protection Act (Senate Bill 25). The Federal 24-hour standard of 150 $\mu g/m^3$ was retained. The State standard was exceeded a total of three times from 2007 to 2009.

Fine Particulate Matter ($PM_{2.5}$)

In 1997, the EPA announced new $PM_{2.5}$ standards. Industry groups challenged the new standard in court and the implementation of the standard was blocked. However, upon appeal by the EPA, the U.S. Supreme Court reversed this decision and upheld the EPA's new standards. On January 5, 2005, the EPA published a Final Rule in the Federal Register that designates the Orange County portion of the Basin as a nonattainment area for Federal $PM_{2.5}$ standards.[2] On June 20, 2002, CARB adopted amendments for statewide annual ambient particulate matter air quality standards. These standards were revised/established due to increasing concerns by CARB that previous standards were inadequate, as almost everyone in California is exposed to levels at or above the current State standards during some parts of the year, and the statewide potential for significant health impacts associated with particulate matter exposure was determined to be large and wide-ranging.[3] The Federal standard was exceeded three times between 2007 and 2009.

Total Suspended Particulates and Visibility

Tiny airborne particles or aerosols that are less than 100 micrometers are collectively referred to as total suspended particulate matter (TSP). These particles constantly enter the atmosphere from many natural sources, including soil, bacteria, viruses, fungi, molds, yeast, and pollen. Manmade sources of TSP also include combustion products from space heating, industrial processes, power generation, and motor vehicle use.

Over 99 percent of inhaled particulate matter is either exhaled or trapped in the upper areas of the respiratory system and expelled. The balance enters the windpipe and lungs, where some particulates cling to protective mucous and are removed. Other mechanisms, such as coughing, also filter out or remove particles. Collectively, these "pulmonary clearance" mechanisms protect the lungs from the majority of inhalable particles. Irritating odors are often associated with particulates. Some examples of sources are gasoline and diesel engine exhausts, large-scale coffee roasting, paint spraying, street paving, and trash burning. The EPA replaced TSP as the indicator for both the annual and 24-hour primary (i.e., health-related) standards in 1987. The indicator includes only those particles with an aerodynamic diameter smaller than or equal to a nominal ten micrometers (PM_{10}).

Volatile Organic Compounds (VOCs or Reactive Organic Gasses [ROG])

Hydrocarbon compounds are any compounds containing various combinations of hydrogen and carbon atoms that exist in the ambient air. VOCs contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor; some examples include gasoline, alcohol, and the solvents used in paints. There are no specific State or Federal VOC thresholds as they are regulated by individual air districts as O_3 precursors.

Lead (Pb)

In the Basin, atmospheric lead is generated almost entirely by the combustion of leaded gasoline and contributes less than one percent of the material collected as TSP. Atmospheric lead concentrations have been reduced substantially in recent years due to the lowering of average lead content in gasoline. Exceedances of the State air quality standard for lead (monthly average concentration of 1.50 $\mu g/m^3$) now are confined to the densely populated portions of Orange County, where vehicle traffic is greatest.

[2] http://www.epa.gov/fedrgstr/EPA-AIR/2005/January/Day-05/a001.pdf

[3] *Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates*. California Environmental Protection Agency, Air Resources Board, May 3, 2002.

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5.0 POTENTIAL AIR QUALITY IMPACTS

5.1 SHORT-TERM IMPACTS

Alternative 1 (No Build)

Alternative 1 (No Build) proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits. As a result, no construction-related activities would occur with Alternative 1 and there would be no construction-related impacts.

Alternative 2

Alternative 2 would remove the existing I-5 paved shoulders and construct a new travel way and new shoulder pavement to the outside of the northbound and southbound lanes to accommodate an HOV lane. Additionally, Alternative 2 would improve the Avenida Pico interchange. Short-term impacts to air quality would occur during pavement removal and construction activities. Additional sources of construction-related emissions include:

- Exhaust emissions and potential odors from construction equipment used on the construction site, as well as the vehicles used to transport materials to and from the site; and
- Exhaust emissions from the motor vehicles of the construction crew.

Construction of the proposed project is anticipated to commence in 2015 and be completed by February 2019. As a result, project construction would not last more than five years and is considered temporary. Stationary or mobile powered on-site construction equipment would include trucks, tractors, signal boards, excavators, backhoes, concrete saws, crushing and/or processing equipment, graders, trenchers, pavers, and other paving equipment.

In order to further minimize construction-related emissions, all construction vehicles and construction equipment would be required to be equipped with State-mandated emission control devices pursuant to State emission regulations and standard construction practices. After construction of the proposed project is complete, all construction-related impacts would cease, thus resulting in a less than significant impact. Short-term construction particulate matter emissions would be further reduced through the implementation of dust suppression measures outlined within SCAQMD Rule 403. Caltrans Standard Specifications for Construction (Section 10 and 18 [Dust Control] and Section 39-3.06 [Asphalt Concrete Plants]) would also be adhered to. The proposed project would comply with any State, Federal, and/or local rules and regulations developed as a result of implementing control and mitigation measures proposed as part of their respective SIPs. Therefore, project construction is not anticipated to violate State or Federal air quality standards or contribute to the existing air quality violations in the Basin.

PM_{10} Mitigation During Construction

The approved CARB *2003 South Coast Particulate Matter SIP* (August 2003) contains provisions for construction mitigation of PM_{10}. According to the *2003 South Coast Particulate Matter SIP*, the project documents would be required to include specifications, estimates, and control measures in its final plans that would limit PM_{10} emissions during construction. Since PM_{10} emissions primarily occur during the grading phase of construction, the SCAQMD has established Rule 402 and Rule 403. During construction, the property owner, developer, and contractors are required to comply with regional rules, which assist in reducing short-term construction-related air pollutant emissions. As previously stated, Rule 402 requires that air pollutant emissions not be a nuisance off-site. Rule 403 requires that fugitive

dust be controlled with the best available control measures in order to reduce dust so that it does not remain visible in the atmosphere beyond the property line of the proposed project.

Rule 403 requires that all active operations utilize the applicable best available control measures included in Table 1 of Rule 403. Table 1 of Rule 403 is intended to minimize fugitive dust emissions from each fugitive dust source type within the active operation. The applicable control measures target various construction operations such as backfilling, clearing and grubbing, crushing, cut and fill, demolition, earth-moving activities, bulk material import and export, construction staging, stockpiles/bulk material handling, trenching, and loading. The applicable measures from Table 1 of Rule 403 suggest methods such as covering stockpiles with tarps, and the application of water to stabilize materials.

Large operations are also required to implement additional dust control measures, which are provided in Table 2 of Rule 403 (Dust Control Measures for Large Operations). Rule 403 defines large operations as projects that contain more than 50 acres of disturbed surface area, or exceed a daily earth-moving volume of 3,850 cubic meters (5,000 cubic yards) three times during the most recent 365-day period. Depending on the grading and construction schedule, the proposed project may be considered a large operation under Rule 403. Consequently, the proposed project would be subject to the applicable measures identified in Table 2 of Rule 403, which provides additional control actions that are more detailed than the measures provided in Table 1 of Rule 403.

Table 3 (Contingency Control Measures for Large Operations) of Rule 403 provides contingency measures for windy conditions. Construction activities are not allowed to exceed 50 micrograms per cubic meter for PM_{10}. Large operations that fail to meet this performance standard are required to implement applicable measures specified in Table 3 of Rule 403. The proposed project would implement all applicable measures presented in Rule 403, Table 3, in order to attain a maximum reduction in particulate emissions. The measures in Table 3 of Rule 403 include actions such as more stringent watering methods, chemical stabilizers, covering all haul vehicles, and ceasing all active operations.

Rule 403 also prohibits projects from allowing track-outs to extend 25 feet or more in cumulative length from the point of origin from an active operation. All track-outs are required to be removed at the conclusion of each workday or evening shift. Any projects with a disturbed surface area of five or more acres or with a daily import or export of 100 cubic yards or more of bulk materials must utilize at least one of the specified track-out control measures at each vehicle egress from the site to a paved public road. The specified track-out control measures consist of installation of washed gravel pads, paving project ingress/egress, wheel shakers, wheel washing systems, and any other approved control measures.

Alternative 3

Alternative 3 is very similar to Alternative 2; however, Alternative 3 would have slightly different ramp modifications on the Camino Capistrano (Stonehill Drive) ramp and would not modify the Valle Road (San Juan Creek Road) ramp. Additionally, Alternative 3 would include a two-foot median shoulder for the northern portion of the compound curve. Construction of Alternative 3 is anticipated to commence in 2015 and be completed by February 2019. During the construction phase of Alternative 3, adherence to the State emission regulations and standard construction practices would ensure that a less than significant impact would occur. Additionally, compliance with SCAQMD Rules 402 and 403 would ensure less than significant impacts in regards to particulate matter emissions.

Alternative 4

Alternative 4 has similar improvements as Alternative 2 and Alternative 3; however, Alternative 4 does not propose a buffer, as opposed to the four-foot buffer proposed in Alternative 2 and Alternative 3.

Modifications to the auxiliary lanes, ramps, and structures would be the same as Alternative 3. However, Alternative 4 would provide a standard 10-foot median shoulder for the northern portion of the compound curve. Construction of Alternative 4 is anticipated to commence in 2015 and be completed by February 2019. During the construction phase of Alternative 4, adherence to the State emission regulations and standard construction practices would ensure that a less than significant impact would occur. Additionally, compliance with SCAQMD Rules 402 and 403 would ensure less than significant impacts in regards to particulate matter emissions.

5.2 PARTICULATE MATTER ANALYSIS

Nonattainment/maintenance areas are subject to the Transportation Conformity Rule, which requires local transportation and air quality officials to coordinate planning to ensure that transportation projects, such as road construction, do not affect an area's ability to reach its clean air goals. Transportation conformity requirements become effective one year after an area is designated as nonattainment.

A qualitative hot-spot analysis is defined in 40 CFR 93.101 as an estimation of likely future localized pollutant concentrations resulting from a new transportation project and a comparison of those concentrations to the relevant air quality standard. A hot-spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, including, for example, congested roadway intersections and highways or transit terminals. Such an analysis is a means of demonstrating that a transportation project meets FCAA conformity requirements to support state and local air quality goals with respect to potential localized air quality impacts.

The EPA again published a final rule on March 10, 2006 (effective as of April 5, 2006) and established conformity criteria and procedures for transportation projects to determine their impacts on ambient PM_{10} levels in nonattainment and maintenance areas. The March 10, 2006 final rule requires a qualitative PM_{10} hot-spot analysis to be completed for a project of air quality concern (POAQC). The proposed project is within a nonattainment area for federal $PM_{2.5}$ and PM_{10} standards. Therefore, per 40 CFR Part 93, analyses are required for conformity purposes. However, the EPA does not require hot-spot analyses (either qualitative or quantitative) for those that are not listed in Section 93.123(b)(1) as a project of air quality concern.

Alternative 1 (No Build)

Alternative 1 (No Build) proposes no improvements to I-5, thereby maintaining the existing four general purpose lanes throughout the project limits. As a result, no modifications to I-5 would occur and a particulate matter hot-spot analysis would not be required. Therefore, Alternative 1 would not have impacts regarding particulate matter hot-spots.

Alternative 2

Alternative 2 would involve removal of the existing I-5 paved shoulders and constructing a new travel way and new shoulder pavement to the outside of the northbound and southbound lanes to accommodate HOV lanes. Additionally, Alternative 2 would improve the Avenida Pico interchange. The following discussion addresses why the proposed project does not qualify as a POAQC pursuant to the March 10, 2006 final rule:

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

The proposed project is not a new highway project that would have a significant number of, or increase in, diesel vehicles. The project would widen I-5 to extend the HOV lane in the northbound and southbound direction in order to achieve a higher person carrying capacity and to improve air quality along this corridor. Implementation of the proposed project would achieve the objectives to improve overall performance within the project limits and to relieve local street congestion within the interchange areas. Table 4 (Existing Traffic Volumes) depicts the existing traffic volumes along each segment within the project limits. As shown in Table 4, existing traffic volumes range from 184,000 to 241,200 average daily trips (ADT), which includes truck[4] volumes that range from 7,388 to 9,648 ADT. The criteria in 40 CFR 93.123(b)(1) focus on a significant increase in diesel vehicles to determine particulate matter hot-spot impacts. The March 2006 Final Rule indicates that projects may be of concern where total traffic is over 125,000, and diesel trucks are eight percent or more of that traffic. Therefore, truck trip volumes are presented in Table 4.

Table 4
EXISTING TRAFFIC VOLUMES

Location	Existing Conditions (2009)		
	ADT	% Trucks	# Trucks
I-5 Mainline			
South of Avenida Pico	184,700	4	7,388
South of Vista Hermosa	192,600	4	7,704
South of Camino de Los Mares	209,800	4	8,392
South of PCH/Camino Las Ramblas	228,500	4	9,140
South of Camino Capistrano/Stonehill	221,400	4	8,856
South of San Juan Creek	241,200	4	9,648
ADT = Average Daily Traffic; PCH = Pacific Coast Highway			
Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.			

Table 5 (Future Year 2040 Traffic Volumes) compares the "2040 No Build" and "2040 Build" traffic volumes along each freeway segment. As shown in Table 5, traffic volumes within the project limits exceed 125,000 vehicles daily. The 2006 Guidelines have two criteria to identify a "significant volume of diesel traffic," which include facilities with greater than 125,000 ADT and eight percent or more of said traffic volumes (i.e., approximately 10,000 vehicles or more). However, the percentage of trucks along this corridor is four percent, which is below the national average of eight percent[5]. Based on the Caltrans document entitled *California Statewide PM Hot Spot Procedures* (dated October 19, 2007), a "significant increase" of diesel vehicles (trucks) is 5 percent when comparing Build with No Build alternatives. As depicted in Table 5, the greatest increase in truck volumes would be 3.25 percent. The average increase among all segments within the project limits would be 1.22 percent. As a result, the proposed project would not result in a significant increase of diesel vehicles.

[4] For the purposes of the particulate matter hot-spot analysis and pursuant to the requirements in 40 CFR 93.123(b)(1), the analysis of diesel vehicles focuses on truck trips, which primarily use diesel fuel. California truck traffic counts are in terms of axles rather than weight or fuel type and are based on all trucks (2 or more axle). While heavy-duty trucks, typically with 3 or more axles, are almost exclusively diesel-powered, many 2-axle trucks (for instance, delivery trucks) are not. Therefore, using only 2 or more axle truck volume as a screening criterion is conservative.

[5] Federal Highway Administration, *Highway Statistics 2004*, March 2006.

Table 5
FUTURE YEAR 2040 TRAFFIC VOLUMES

Location	2040 No Build			2040 Build			# Trucks Percent Change
	ADT	% Trucks	# Trucks	ADT	% Trucks	# Trucks	
I-5 Mainline							
South of Avenida Pico	246,000	4	9,840	254,000	4	10,160	3.25%
South of Vista Hermosa	256,000	4	10,240	260,000	4	10,400	1.56%
South of Camino de Los Mares	267,000	4	10,680	270,000	4	10,800	1.12%
South of PCH/Camino Las Ramblas	293,000	4	11,720	296,000	4	11,840	1.02%
South of Camino Capistrano/Stonehill	279,000	4	11,160	280,000	4	11,200	0.36%
South of San Juan Creek	300,000	4	12,000	300,000	4	12,000	0.00%

ADT = Average Daily Traffic; PCH = Pacific Coast Highway

Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.

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

The proposed project does not affect intersections that are at Level of Service (LOS) D, E, or F with a significant number of diesel vehicles. As noted above, implementation of the project would enhance traffic flow along this segment of I-5. Based on the traffic data in Table 5, the proposed project would not result in significant changes in traffic volume, vehicle mix, or other factors that would cause an increase in emissions compared to the no-build conditions.

Table 6 (Intersection LOS Summary - Interchanges) depicts the LOS for the study intersections in the project area for the existing and forecast future year 2040 Build and No Build conditions. As shown in Table 6, implementation of the proposed project would not change interchange LOS significantly between Build and No Build conditions. Additionally, Table 7 (Intersection LOS Summary – City Locations) depicts the intersection LOS for various city locations in the proposed project study area. As shown in Table 7, the majority of intersections would not experience a significant change in LOS between Build and No Build conditions.

Additionally, Table 8 (Freeway Segment and Ramp Peak-Hour Volume and Capacity Analysis) summarizes the existing and forecast future year 2040 peak-hour volume to capacity analysis for the project limits on I-5. As shown in Table 8, implementation of the proposed project would alleviate several peak-hour mainline and freeway ramp deficiencies, thereby reducing congestion.

Table 6
INTERSECTION LOS SUMMARY – INTERCHANGES

Location	Existing				No Build				Build			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
I-5 SB Ramps & Junipero Serra Road	16.2	B	19.6	B	20.9	C	42.0	D	21.5	C	41.8	D
I-5 NB Ramps & Junipero Serra Road	16.0	B	16.5	B	14.5	B	19.7	B	18.2	B	17.5	B
I-5 SB Ramps & Ortega Highway	37.3	D	59.1	E	26.4	C	36.2	D	27.6	C	34.8	C
I-5 NB Ramps & Ortega Highway	33.5	C	25.8	C	25.3	C	19.2	B	23.4	C	19.1	B
Camino Capistrano & I-5 SB Ramps	18.7	B	27.0	C	78.8	E	152.0	F	78.9	E	151.4	F
Valle Road & I-5 NB Ramps	11.6[1]	B[1]	16.4[1]	C[1]	22.5[1]	C[1]	40.0[1]	E[1]	21.2[1]	C[1]	40.0[1]	E[1]
I-5 SB Ramps & Camino Las Ramblas	2.6	A	3.3	A	3.2	A	5.2	A	3.7	A	6.0	A
I-5 NB Ramps & Camino Las Ramblas	3.9	A	4.0	A	6.5	A	6.9	A	4.4	A	8.4	A
I-5 SB Ramps & Camino De Estrella	16.4	B	25.6	C	18.6	B	33.0	C	18.7	B	33.0	C
I-5 NB Ramps & Camino De Estrella	11.1	B	13.1	B	13.7	B	15.5	B	13.5	B	15.6	B
I-5 SB Ramps & Avenida Vista Hermosa	9.6	A	8.4	A	18.0	B	17.6	B	18.4	B	15.4	B
I-5 NB Ramps & Avenida Vista Hermosa	6.7	A	5.9	A	8.9	A	7.3	A	8.2	A	7.1	A
I-5 SB Ramps & Avenida Pico	25.4	C	24.6	C	19.4	B	17.8	B	19.1	B	17.9	B
I-5 NB Ramps & Avenida Pico	11.5	B	15.9	B	9.5	A	13.3	B	9.3	A	12.3	B
I-5 SB Ramps & Avenida Palizada	8.3	A	8.5	A	8.9	A	9.0	A	8.8	A	9.2	A
I-5 NB Ramp & Avenida Palizada	52.2[2]	F[2]	33.3[2]	D[2]	67.1[2]	F[2]	40.6[2]	E[2]	63.8[2]	F[2]	35.9[2]	E[2]
I-5 SB Ramps & Avenida Presidio	17.0[3]	C[3]	17.1[3]	C[3]	74.8[3]	F[3]	36.7[3]	E[3]	74.8[3]	F[3]	36.7[3]	E[3]
I-5 NB Ramps & Avenida Presidio	15.1	B	16.8	B	15.7	B	16.7	B	16.0	B	16.9	B
I-5 SB Ramps & El Camino Real/Avenida Valencia	14.3	B	19.9	B	14.3	B	19.3	B	14.3	B	19.3	B
I-5 NB Ramps & El Camino Real	5.2	A	5.3	A	5.2	A	5.9	A	5.2	A	5.9	A
S. El Camino Real & I-5 NB Ramps	38.2[3]	E[3]	39.0[3]	E[3]	n/a	F[3]	189.7[3]	F[3]	n/a	F[3]	153.6[3]	F[3]
Avenida Presidente & Avenida Calafia	9.6[1]	A[1]	11.0[1]	B[1]	12.8[1]	B[1]	31.5[1]	D[1]	12.8[1]	B[1]	33.4[1]	D[1]
I-5 NB Ramps & Cristianitos Road	15.7[3]	C[3]	16.2[3]	C[3]	28.7[3]	D[3]	42.4[3]	E[3]	28.7[3]	D[3]	42.4[3]	E[3]
I-5 SB Ramps & Cristianitos Road	10.8[3]	B[3]	16.7[3]	C[3]	32.1[3]	D[3]	288.5[3]	F[3]	32.1[3]	D[3]	288.5[3]	F[3]

Bold = exceeds performance standard of level of service (LOS) "D"; NB = northbound; SB = southbound; LOS = level of service

Notes:
1. All-way stop – delay represents the intersections average vehicle delay
2. Yield – delay represents the yielding movement with highest approach delay
3. Two-way stop – delay represents the movement with highest control delay

Source: Austin Foust Associates, *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.

Table 7
INTERSECTION LOS SUMMARY – CITY LOCATIONS

Location	Existing				No Build				Build			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS
Camino Capistrano & Junipero Serra Road	0.42	A	0.39	A	0.52	A	0.54	A	0.52	A	0.54	A
Rancho Viejo & Junipero Serra Road	0.53	A	0.64	B	0.88	D	0.78	C	0.90	D	0.81	D
Del Obispo Street & Ortega Highway	0.5	A	0.53	A	0.55	A	0.67	B	0.55	A	0.67	B
Rancho Viejo & Ortega Highway	0.72	C	0.83	D	0.77	C	0.94	E	0.77	C	0.94	E
La Pata & Ortega Highway	0.80	C	0.68	B	0.74	C	0.73	C	0.74	C	0.74	C
Camino Capistrano & Del Obispo Street	0.68	B	0.79	C	0.95	E	0.90	D	0.95	E	0.89	D
Camino Capistrano & San Juan Creek Road	0.36	A	0.40	A	0.65	B	0.70	B	0.65	B	0.70	B
Valle Road & San Juan Creek Road	0.68	B	0.65	B	0.75	C	0.79	C	0.75	C	0.79	C
La Novia Avenue & San Juan Creek Road	0.48	A	0.37	A	0.77	C	0.74	C	0.76	C	0.73	C
Del Obispo Street & Stonehill Road	0.69	B	0.65	B	0.79	C	0.72	C	0.79	C	0.72	C
Camino Capistrano & Stonehill Road	0.64	B	0.68	B	0.90	D	0.84	D	0.90	D	0.84	D
Camino Mira Costa & Camino Estrella	0.33	A	0.33	A	0.35	A	0.36	A	0.35	A	0.36	A
Avenida Vaquero & Camino De Los Mares	0.36	A	0.38	A	0.44	A	0.41	A	0.44	A	0.41	A
Camino Vera Cruz & Camino De Los Mares	0.32	A	0.36	A	0.34	A	0.34	A	0.34	A	0.34	A
Camino Del Rio & Camino De Los Mares	0.25	A	0.20	A	0.38	A	0.32	A	0.38	A	0.32	A
Camino Vera Cruz & Avenida Vista Hermosa	0.70	B	0.73	C	0.74	C	0.73	C	0.73	C	0.72	C
Avenida La Pata & Avenida Vista Hermosa	0.46	A	0.35	A	0.58	A	0.58	A	0.57	A	0.58	A
N. El Camino Real & Avenida Pico	0.44	A	0.46	A	0.55	A	0.70	B	0.57	A	0.71	C
Avenida La Pata & Avenida Pico	0.25	A	0.38	A	0.46	A	0.47	A	0.45	A	0.48	A
Avenida Vista Hermosa & Avenida Pico	0.24	A	0.23	A	0.44	A	0.60	A	0.44	A	0.60	A
N. El Camino Real & Avenida Palizada	0.49	A	0.59	A	0.56	A	0.70	B	0.55	A	0.68	B
Camino Estrella & Avenida Palizada	0.46	A	0.55	A	0.53	A	0.59	A	0.52	A	0.60	A
N. El Camino Real & Avenida Presidio/Victoria	0.38	A	0.41	A	0.44	A	0.46	A	0.44	A	0.47	A

Bold = exceeds performance standard of level of service (LOS) "D"; ICU = Intersection Capacity Utilization; LOS = Level of Service

Source: Austin Foust Associates, *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.

Table 8
FREEWAY SEGMENT AND RAMP PEAK-HOUR VOLUME AND CAPACITY ANALYSIS

Location	Existing		2040 No Build		2040 Build	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	V/C - LOS	V/C - LOS	V/C - LOS	V/C - LOS	V/C - LOS	V/C - LOS
I-5 Mainline – Northbound						
South of Avenida Pico	0.70 – C	0.69 – C	0.92 – E	0.84 – D	0.93 – E	0.85 – D
South of Vista Hermosa	0.74 – C	0.75 – D	0.97 – E	0.92 – E	0.87 – D	0.84 – D
South of Camino de Los Mares	0.83 – D	0.81 – D	1.11 – F	1.00 – E	0.99 – E	0.92 – E
South of PCH/Camino Las Ramblas	0.92 – E	0.88 – D	1.27 – F	1.04 – F	1.15 – F	0.95 – E
South of Camino Capistrano/Stonehill	0.75 – D	0.66 – C	1.07 – F	0.82 – D	1.06 – F	0.82 – D
South of San Juan Creek	0.92 – E	0.78 – D	1.24 – F	1.01 – F	1.23 – F	1.01 – F
I-5 Mainline – Southbound						
South of Avenida Pico	0.51 – B	0.62 – C	0.70 – C	0.84 – D	0.70 – C	0.84 – D
South of Vista Hermosa	0.69 – C	0.80 – D	0.93 – E	1.06 – F	0.85 – D	0.91 – E
South of Camino de Estrella	0.74 – C	0.89 – D	1.02 – F	1.21 – F	0.87 – D	0.99 – E
South of PCH/Camino Las Ramblas	0.73 – C	0.89 – D	0.99 – E	1.16 – F	0.87 – D	1.01 – F
South of Camino Capistrano/Stonehill	0.59 – B	0.81 – D	0.79 – D	1.00 – F	0.83 – D	1.08 – F
South of San Juan Creek	0.59 – B	0.81 – D	0.79 – D	1.00 – F	0.83 – D	1.08 – F
I-5 Freeway Ramps – Northbound						
Avenida Pico Off Ramp	0.53 – B	0.51 – B	0.55 – B	0.60 – C	0.55 – C	0.59 – C
Avenida Pico On Ramp	0.74 – C	0.91 – E	0.85 – D	1.05 – F	0.72 – C	0.88 – D
Vista Hermosa Off Ramp	0.22 – A	0.28 – A	0.35 – B	0.40 – B	0.34 – B	0.39 – B
Vista Hermosa Loop On Ramp	0.05 – A	0.05 – A	0.20 – A	0.21 – A	0.20 – A	0.21 – A
Vista Hermosa Direct On Ramp	0.69 – C	0.56 – C	0.94 – E	0.69 – C	0.95 – E	0.69 – C
Camino de Los Mares Off Ramp	0.26 – A	0.35 – B	0.31 – B	0.55 – C	0.31 – A	0.55 – C
Camino de Los Mares Loop On Ramp	0.42 – B	0.33 – B	0.52 – B	0.37 – B	0.52 – B	0.37 – B
Camino de Los Mares Direct On Ramp	0.53 – B	0.53 – B	0.92 – E	0.55 – C	0.91 – E	0.54 – C
PCH/Camino Las Ramblas Off Ramp	0.54 – C	0.72 – C	0.63 – C	0.73 – C	0.63 – C	0.73 – C
PCH/Camino Las Ramblas On Ramp	0.52 – B	0.37 – B	0.54 – C	0.43 – B	0.53 – B	0.42 – B
Camino Capistrano/Stonehill On Ramp	0.84 – D	0.58 – C	0.85 – D	0.93 – E	0.84 – C	0.93 – E
San Juan Creek Off Ramp	0.04 – A	0.07 – A	0.46 – B	0.37 – B	0.45 – B	0.37 – B
San Juan Creek On	0.21 – A	0.02 – A	0.53 – B	0.32 – A	0.52 – B	0.32 – A
I-5 Freeway Ramps – Southbound						
Avenida Pico On Ramp	0.37 – B	0.53 – B	0.49 – B	0.64 – C	0.49 – B	0.63 – C
Avenida Pico Off Ramp	0.44 – B	0.45 – B	0.56 – C	0.49 – B	0.56 – C	0.49 – B
Vista Hermosa On Ramp	0.28 – A	0.26 – A	0.35 – B	0.29 – A	0.34 – B	0.28 – A
Vista Hermosa Off Ramp	0.57 – C	0.80 – D	0.87 – D	1.13 – F	0.58 – C	0.76 – D
Camino de Estrella On Ramp	0.32 – A	0.35 – B	0.39 – B	0.51 – B	0.39 – B	0.51 – B
Camino de Estrella Off Ramp	0.49 – B	0.95 – E	0.55 – C	0.99 – D	0.36 – B	0.67 – C
PCH/Camino Las Ramblas On Ramp	0.99 – E	1.19 – F	1.31 – F	1.53 – F	0.92 – E	0.97 – E
PCH/Camino Las Ramblas Loop On Ramp	0.13 – A	0.10 – A	0.26 – A	0.21 – A	0.26 – A	0.23 – A
PCH/Camino Las Ramblas Off Ramp	0.34 – B	0.56 – C	0.37 – B	0.57 – C	0.36 – B	0.57 – C
San Juan Creek Off Ramp	0.23 – A	0.29 – A	0.51 – B	0.41 – B	0.51 – B	0.41 – B
San Juan Creek On Ramp	0.49 – B	0.77 – D	0.71 – C	0.96 – E	0.72 – C	0.95 – E

V/C = vehicle to capacity ratio; LOS = Level of Service; PCH = Pacific Coast Highway

Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.

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

The proposed project does not involve new bus or rail terminals or transfer points with a significant number of diesel vehicles congregating at a single location. The proposed project would alleviate the existing and projected traffic congestion occurring along I-5.

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

The proposed project does not involve expanded bus or rail terminals or transfer points with a significant number of diesel vehicles congregating at a single location. As stated above, the proposed project involves an HOV lane extension and would alleviate existing and projected traffic congestion.

v. Projects 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.

The proposed project is included in the Southern California Association of Governments (SCAG) *2008 Regional Transportation Plan* (RTP) and the adopted *2008 Regional Transportation Improvement Program* (RTIP). The 2008 RTP was found by FHWA/FTA to conform to the SIP on June 15, 2008, and the 2008 RTIP was found conforming on November 17, 2008. This hot-spot analysis is based on assumptions from the 2008 RTP and RTIP, the *City of San Juan Capistrano General Plan*, the *City of Dana Point General Plan*, and the *City of San Clemente General Plan*. The Regional Transportation Model produced by SCAG predicts ADT volumes based upon socio-economic data received from all of the counties and cities within their jurisdiction. The traffic volumes and peak-hour demand are derived from the number of households, population, and number of jobs in the region. The ADT is derived by iterative model runs designed to determine the shortest route for travelers in time and distance. The Build alternatives would improve traffic flow and relieve congestion. As shown in Table 5, the proposed project would not significantly increase traffic volumes in the project area and the redistribution of traffic and impacts on other facilities is not anticipated. Additionally, as shown in Table 8, implementation of the proposed project would alleviate several peak-hour mainline and freeway ramp deficiencies and would reduce congestion.

In order to implement the hot-spot analysis requirements of the March 10, 2006 final rule, the *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas* (2006 Guidelines) was developed by the EPA and the FHWA. "Conformity" in an air quality context is the FCAA requirement that all Federal actions conform to the letter and spirit of the SIP. The SIP is the State's plan for attaining and maintaining attainment of the NAAQS. Conformity requirements are set forth in Section 176(c) of the Clean Air Act, which is codified in 42 USC 7506(c). Specific criteria and procedures for carrying out the conformity process are in the Code of Federal Regulations (CFR) at 40 CFR 93 Subparts A (Highways and Transit) and B (General Federal Actions). Essentially, all projects that are funded or approved by FHWA or FTA must follow the procedures and criteria specified in Subpart A. This "Transportation Conformity Rule" specifies that projects that are not fully exempt from conformity requirements must have a project-level conformity analysis. The conformity analysis must address whether or not the project comes from a conforming regional transportation plan and transportation improvement program, or has an equivalent regional analysis in nonattainment or maintenance areas that do not have a Metropolitan Planning Organization

(MPO), and includes hot-spot analysis and related commitments where applicable. A hot-spot analysis is required in nonattainment and maintenance areas for CO, PM_{10}, and $PM_{2.5}$.

The 2006 Guidelines references a two-step criteria to identify "a significant volume of diesel truck traffic." The first criterion is facilities with greater than 125,000 ADT. If the first criterion is met, the second criterion is that eight percent or more of said traffic volumes (i.e., approximately 10,000 vehicles or more) are diesel truck traffic volumes. With respect to traffic volumes along the project limits of I-5, horizon year (2040) ADT volumes are forecast to be above the screening-level threshold criteria of 125,000 total ADT traffic volumes. The maximum heavy truck ADT volumes during the horizon year (2040) would be only four percent of the ADT. Due to the future Build and No Build traffic volumes along this corridor, the four percent of trucks would be above the threshold screening criteria of approximately 10,000 daily truck trips. As such, the proposed project may result in a substantial number of diesel vehicles within the project area (i.e., the project limits of I-5). However, based on the Caltrans *California Statewide PM Hot Spot Procedures* (dated October 19, 2007), a "significant increase" of diesel vehicles is 5 percent comparing Build with No Build alternatives. As shown in Table 5, the greatest increase in truck volumes would be 3.25 percent. The average increase among all segments within the project limits would be 1.22 percent. As a result, the proposed project would not result in a significant increase of diesel vehicles. According to the 2006 Guidelines, this project would not be considered a POAQC under 40 CFR 93.123(b)(1).

Under NEPA Delegation, FHWA has assigned its NEPA responsibilities to Caltrans for highway projects. There are two forms of assignment: Section 6004, which covers most Categorical Exclusion (CE) determinations, and Section 6005, the broader Pilot Program. Projects covered under Section 6004 are processed using certain NEPA CEs only, and the conformity determination is made along with NEPA approval by Caltrans. Projects covered under Section 6005 include some that use a NEPA CE, and all that use a higher level document leading to a Finding of No Significant Impact (FONSI) or Record of Decision (ROD). Air quality conformity determinations were expressly excluded from the Pilot Program assignment by statute. Therefore, Section 6005 projects continue to require a conformity determination from FHWA, although all other NEPA-related actions are assigned to Caltrans.

Projects that are approved under the Section 6005 or Pilot Program NEPA assignment must include evidence in the project file that one of the three following situations applies:

1. Conformity does not apply to the project area. This would be true if the area is "attainment/unclassifiable" for all NAAQS (i.e., it has never been nonattainment for any of the current NAAQS). As of August 2007, this was true in all of Districts 1, 2, and 5, and parts of Districts 3, 4, 8, 9, and 10. The official source of area designation information is the U.S EPA's "Green Book" and the area designation regulations at 40 CFR 81.305 California.

2. The project is exempt from all conformity analysis requirements. This would be true if the project fits one of the categories listed in "Table 2" of the conformity regulations at 40 CFR 93.126, or is a signal synchronization project using only existing signals covered by 40 CFR 93.128. In areas subject to conformity requirements, these projects do not require a project-level analysis or conformity determination. If the project area is designated "attainment/unclassifiable" for CO, PM_{10}, and $PM_{2.5}$, or if the project type is listed in "Table 3" of the conformity rule at 40 CFR 93.127, the project would also be considered exempt from conformity analysis requirements.

3. The project is subject to project-level conformity analysis requirements, and meets the criteria for a conformity determination. This is true if all relevant conformity procedures have been completed, including interagency consultation if a particulate matter hot-spot analysis (including

finding that the project is not a POAQC for PM_{10} or $PM_{2.5}$) is needed, and the project is found to meet all hot-spot and regional (if applicable) conformity criteria.

The proposed project is located within District 12, which is a Federally designated nonattainment area for PM_{10} and $PM_{2.5}$; thus, situation 1 would not apply. "Table 2" of 40 CFR 93.126 describes the projects that are exempt from the requirement to determine conformity. Such projects may proceed toward implementation even in the absence of a conforming transportation plan and TIP. The proposed project does not fall under any of the classifications outlined under "Table 2"; thus, situation 2 would not apply.

Criterion 3 requires interagency consultation to meet all hot-spot conformity criteria. The proposed project was submitted to stakeholders at a Transportation Conformity Working Group (TCWG) meeting on February 23, 2010, pursuant to the interagency consultation requirement of 40 CFR 93.105 (c)(1)(i). Caltrans, EPA, CARB, SCAQMD, and other interagency consultation participants reviewed additional information including the detailed particulate matter analysis and CT-EMFAC model outputs. Upon further review, the TCWG members concurred with the finding that the proposed project was not a POAQC due to the nominal differences in diesel truck volumes between the Build and No Build scenarios, the HOV lane extension would not add significant diesel truck capacity, and the Auxiliary lanes and interchange modifications would not be a major truck traffic generator. Additionally, the proposed project represents the implementation of a Transportation Control Measure (TCM) and would reduce congestion as well as merging and weaving conflicts; refer to Appendix A (PM Interagency Consultation). Therefore, the proposed project would not be considered a POAQC and would be considered exempt under 40 CFR 93.126, as it would not create a new, or worsen an existing, $PM_{2.5}$ or PM_{10} violation.

Alternative 3

Alternative 3 is very similar to Alternative 2; however, Alternative 3 would have slightly different ramp modifications on the Camino Capistrano (Stonehill Drive) ramp and would not modify the Valle Road (San Juan Creek Road) ramp. Additionally, Alternative 3 would include a two-foot median shoulder for the northern portion of the compound curve. As a result, Alternative 3 would not change the traffic volumes, fleet mixes, or levels of service beyond what was analyzed in Alternative 2. As with Alternative 2, Alternative 3 is not expected to introduce significant amounts of diesel truck traffic and is not considered a project of significant concern per the definition contained within 40 CFR 93.123(b)(1). A less than significant impact with respect to particulate matter would occur.

Alternative 4

Alternative 4 has similar improvements as Alternative 2 and Alternative 3; however, Alternative 4 does not propose a buffer, as opposed to the four-foot buffer proposed in Alternative 2 and Alternative 3. Modifications to the auxiliary lanes, ramps, and structures would be the same as Alternative 3. Alternative 4 would not change the traffic volumes, fleet mixes, or levels of service beyond what was analyzed in Alternative 2. As with Alternative 2, Alternative 4 is not expected to introduce significant amounts of diesel truck traffic and is not considered a project of significant concern per the definition contained within 40 CFR 93.123(b)(1). A less than significant impact with respect to particulate matter would occur.

5.3 CO SCREENING ANALYSIS

In California, the procedures of the local analysis for CO are modified pursuant to 40 CFR 93.123(a)(1) of the Transportation Conformity Rule. Sub-paragraph (a)(1) states the following:

> *CO hot-spot analysis*. (1) The demonstrations required by 40 CFR 93.116 ("Localized CO and PM_{10} violations") must be based on a quantitative analysis using the applicable air quality models, data bases, and other requirements specified in 40 CFR part 51, Appendix W (Guideline on Air Quality Models). These procedures shall be used in the following cases, unless different procedures developed through the interagency consultation process required in 40 CFR 93.105 and approved by the EPA Regional Administrator are used:

The sub-paragraph allows for an alternative identified in the *Transportation Project-Level Carbon Monoxide Protocol* (CO Protocol) developed by the Institute of Transportation Studies at the University of California, Davis (UC Davis). The CO Protocol outlines the procedure for performing a CO analysis, which was approved by David P. Howekamp, Director of the Air Division of the U.S. EPA Region IX, in October 1997. The U.S. EPA deemed the CO Protocol as an acceptable option to the mandated quantitative analysis. The CO Protocol incorporates 40 CFR 93.115 through 93.117, and 40 CFR 93.126 through 93.128 into its rules and procedures.

Alternative 1 (No Build)

Alternative 1 (No Build) proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits. As a result, no modifications to I-5 would occur and a CO hot-spot analysis would not be required. Therefore, Alternative 1 would not have impacts regarding CO hot-spots.

Alternative 2

Alternative 2 would remove the existing I-5 paved shoulders to construct a new travel way and shoulder pavement to the outside of the northbound and southbound lanes to accommodate an HOV lane. Additionally, Alternative 2 would improve the Avenida Pico interchange. The scope required for CO local analysis is summarized in the CO Protocol, Section 3 (Determination of Project Requirements); refer to Exhibit 3 (Caltrans CO Protocol Figure 1 – Part 1) and Exhibit 4 (Caltrans CO Protocol Figure 1 [Continued]). Section 4 (Local Analysis) is illustrated in Exhibit 5 (Caltrans CO Protocol Figure 3 – Part 1) and Exhibit 6 (Caltrans CO Protocol Figure 3 – Part 2).

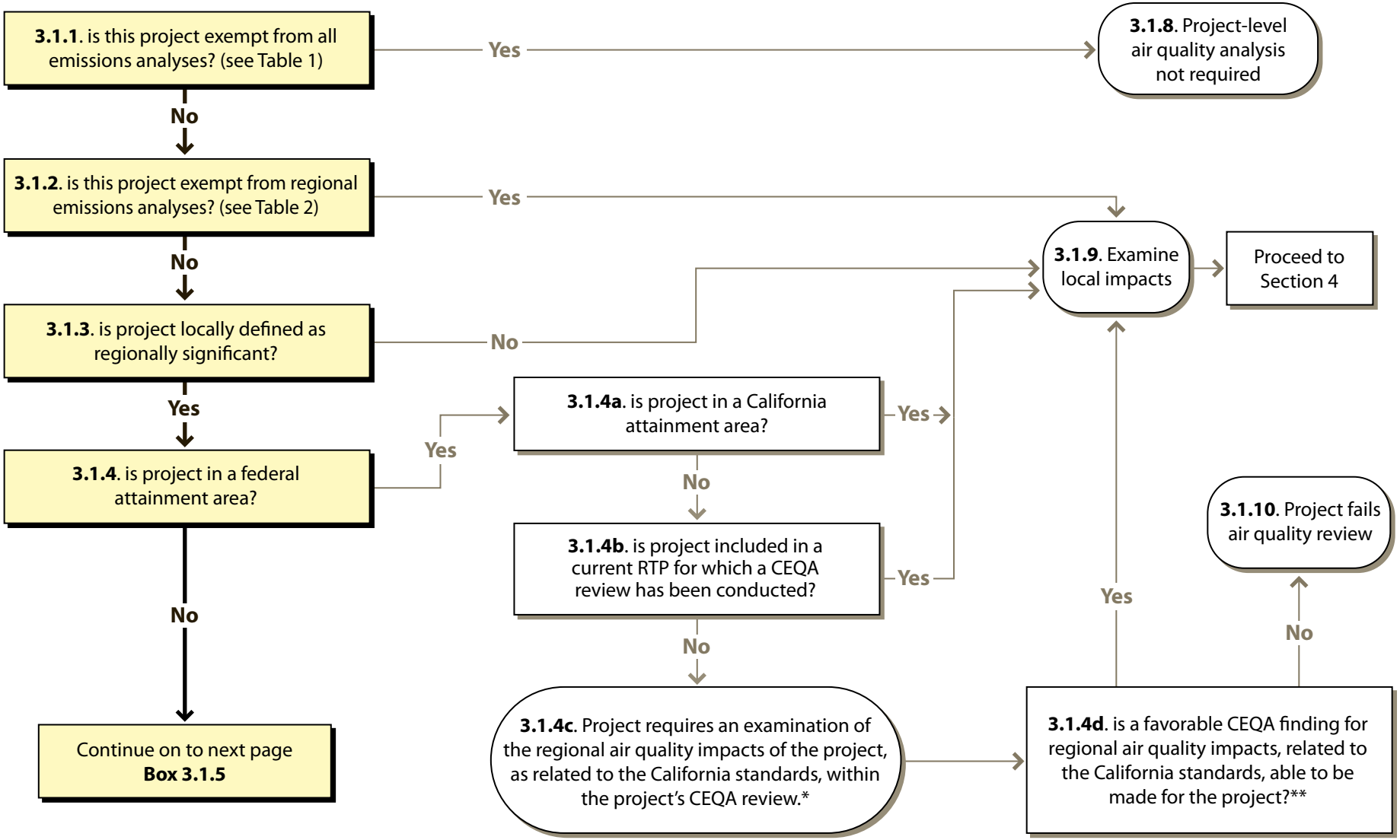
In Section 3, the CO Protocol provides two conformity requirement decision flowcharts that are designed to assist the project sponsor(s) in evaluating the requirements that apply to specific projects. The flowchart in Figure 1 of the CO Protocol applies to new projects and was used in this local analysis conformity decision. Below is a step-by-step explanation of the flow chart. Each level cited is followed by a response, which would determine the next applicable level of the flowchart for the project. 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 §93.126. Section 3.1.1 is inquiring if the project is exempt. Such projects appear in Table 1 of the CO Protocol. The proposed project does not appear in Table 1. It is not exempt from all emissions analyses.

3.1.2. Is this project exempt from regional emissions analyses? **No.** Although the proposed project is included in the 2008 RTIP, it is not exempt since it includes improvements necessary to extend HOV lanes, which is not included in Table 2 of the CO Protocol. As a result, it is not exempt from regional analyses.

3.1.3. Is the project locally defined as regionally significant? **No.** The proposed project is considered regionally significant, as it is included in the 2008 RTIP.

REQUIREMENTS FOR NEW PROJECTS



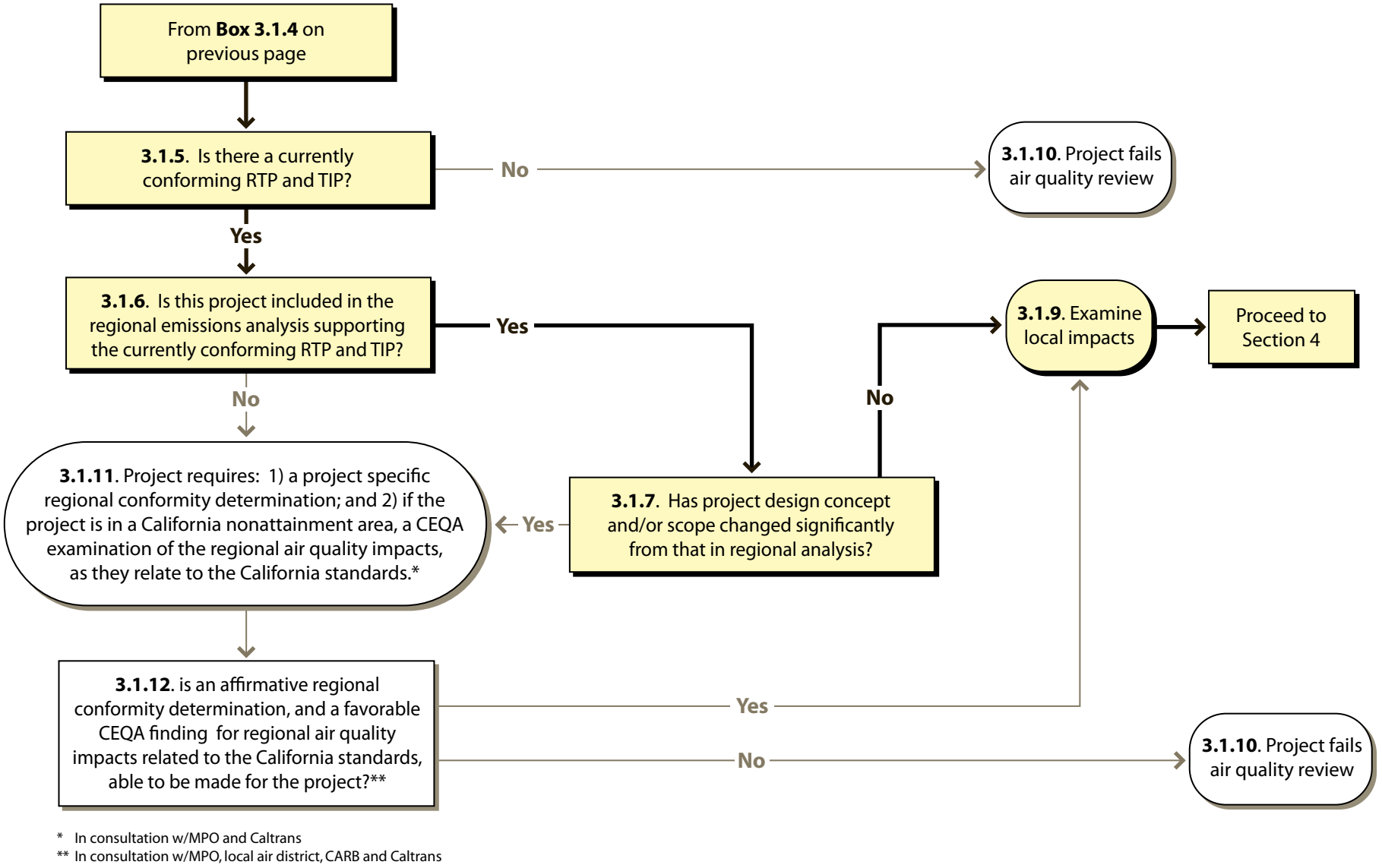
Indicates Selected Choice in Worksheet Methodology.

I-5 HOV LANE EXTENSION PROJECT
AIR QUALITY ASSESSMENT

Caltrans CO Protocol

FIGURE 1 - PART 1

REQUIREMENTS FOR NEW PROJECTS



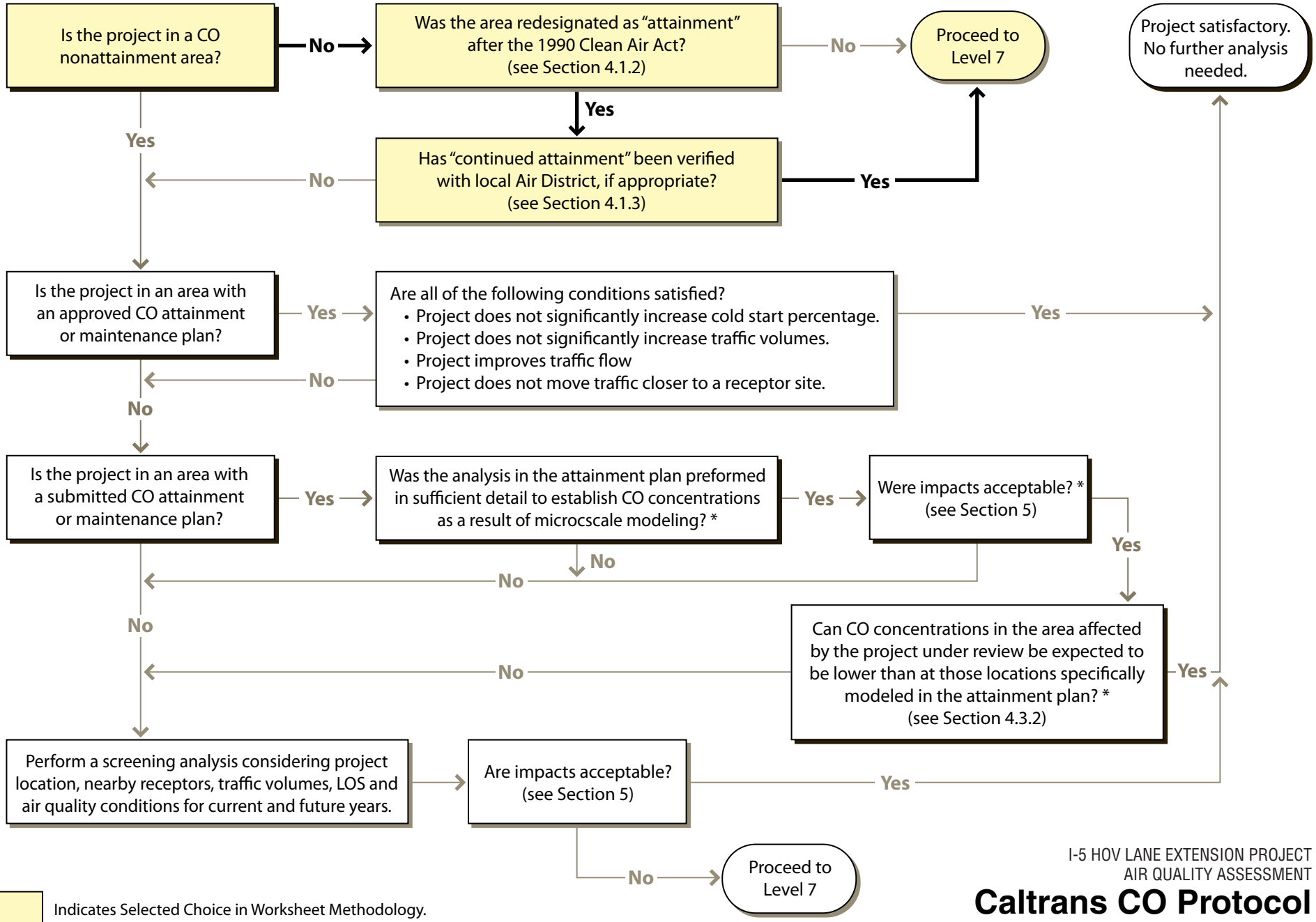
* In consultation w/MPO and Caltrans
** In consultation w/MPO, local air district, CARB and Caltrans

Indicates Selected Choice in Worksheet Methodology.

I-5 HOV LANE EXTENSION PROJECT
AIR QUALITY ASSESSMENT

Caltrans CO Protocol
FIGURE 1 - PART 1 (continued)

LOCAL CO ANALYSIS



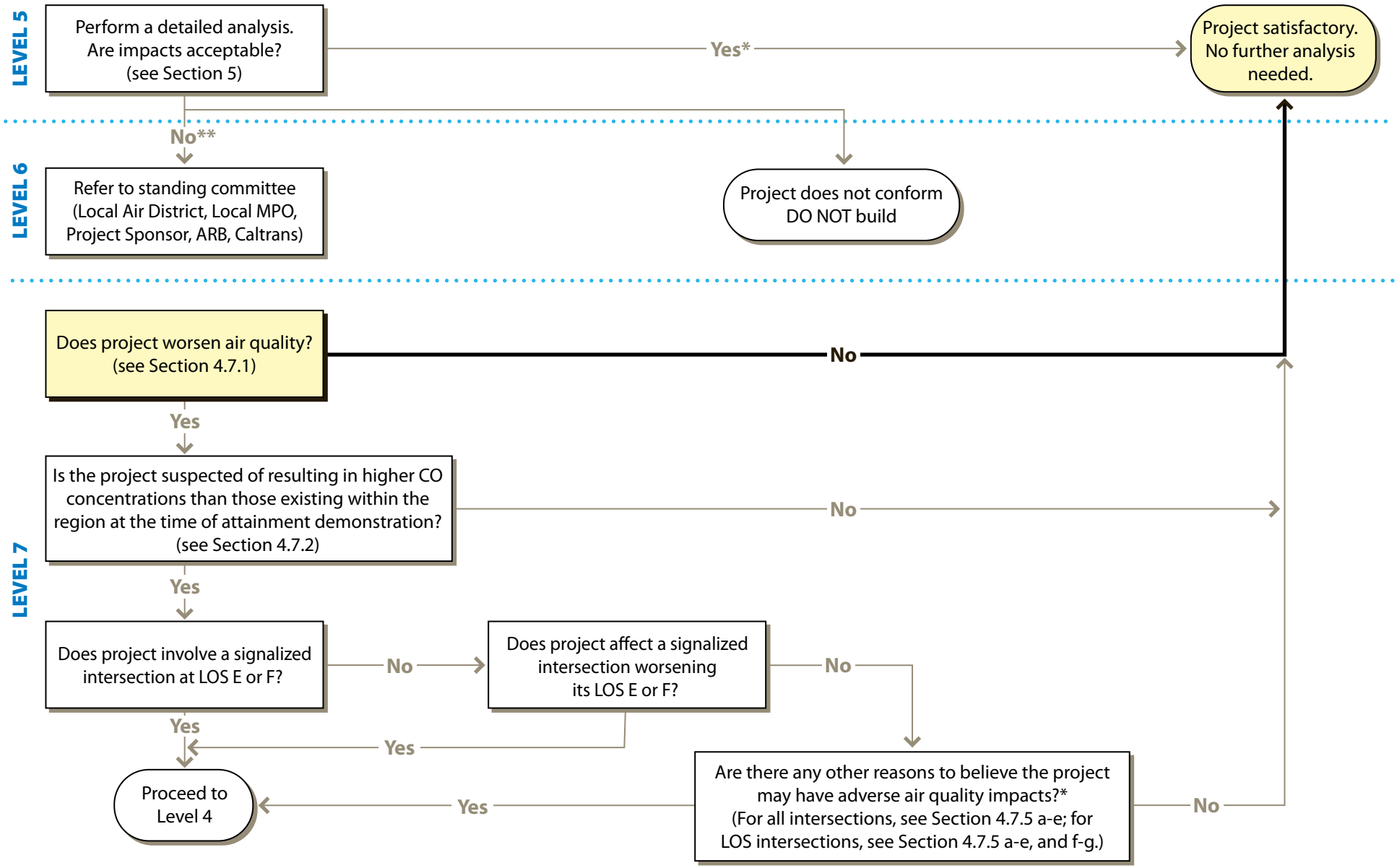
Indicates Selected Choice in Worksheet Methodology.

I-5 HOV LANE EXTENSION PROJECT
AIR QUALITY ASSESSMENT

Caltrans CO Protocol

FIGURE 3 - PART 1

LOCAL CO ANALYSIS



* Consultation with MPO and Local Air District required in addition to normal NEPA/CEQA requirements.
** Consultation with MPO, Local Air District, CARB and Caltrans (District & Headquarters) required in addition to normal NEPA/CEQA.

Indicates Selected Choice in Worksheet Methodology.

I-5 HOV LANE EXTENSION PROJECT • AIR QUALITY ASSESSMENT

Caltrans CO Protocol
FIGURE 3 - PART 2

2/8/10 JN10-106626-16417 MAS

Exhibit 6

3.1.4. Is the project in a Federal attainment area? **No.** The proposed project is within the South Coast Air Basin, which has been designated as an attainment/maintenance area for the Federal CO standards effective June 11, 2007. As the South Coast Air Basin is designated attainment/maintenance, it is not in attainment. The flowchart continues to Box 3.1.5.

3.1.5. Is there a currently conforming RTP and TIP? **Yes.** The proposed project is located in the SCAG region which has a currently conforming RTP and TIP. SCAG's currently conforming RTP is entitled *2008 Regional Transportation Plan (RTP): Making the Connections*, and was adopted on May 8, 2008. FHWA determined the RTP to conform to the SIP on June 5, 2008.[6] Additionally, SCAG has prepared the 2008 Regional Transportation Improvement Program (RTIP) to implement projects and programs listed in the RTP.[7] FHWA determined the RTIP to conform to the SIP on November 17, 2008.

3.1.6. Is the project included in the regional emissions analysis supporting the currently conforming RTP and TIP? **Yes.** The proposed project is included in the regional emissions analysis conducted by SCAG for the conforming 2008 RTP. Therefore, the individual projects contained in the plan are conforming projects, and will have air quality impacts consistent with those identified in the SIP.

3.1.7. Has the project design concept and/or scope changed significantly from that in the regional analysis? **No.** The project design concept refers to the type of facility identified by the proposed project. The project design scope refers to the design aspects that affect the proposed facility's impact on emissions, usually as they related to carrying capacity and control. The proposed project's RTIP listing is in the process of being amended to adjust the postmiles. However, this change would not alter the design concept (i.e., HOV extension), nor would it alter the design scope, because these changes would not impact traffic volumes. Additionally, the proposed project would conform to the SIP once the amendment has been incorporated into the RTIP.

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.

Likewise, Section 4 contains Figure 3 (Local CO Analysis). This flowchart is used to determine the type of CO analysis required for the proposed project. Below is a step-by-step explanation of the flowchart. Each level cited is followed by a response, which would determine the next applicable level of the flowchart for the proposed project. The flowchart begins at level 1:

Level 1. Is the project in a CO non-attainment area? **No.** As stated in 3.1.4, the proposed project is within the South Coast Air Basin, which has been designated as an attainment/maintenance area for the Federal CO standards effective June 11, 2007. Additionally, a summary of the most recent 3 years of the 4-highest monitored CO data is presented below. Data from the Mission Viejo air-monitoring station was used for the years 2007 to 2009; refer to Table 9 (Highest Four Daily Maximum 8-Hour CO [ppm] Averages).

[6] Southern California Association of Governments, *2008 Regional Transportation Plan: Making the Connections*, Adopted May 2008. (http://www.scag.ca.gov/rtp2008)

[7] Southern California Association of Governments, *2008 Regional Transportation Improvement Program*, Adopted 2008. (http://www.scag.ca.gov/RTIP/Index.HTM)

Mission Viejo – 26081 Via Pera

AIRS Number: 060592022
Latitude = 33°37'49" Longitude = 117°40'30"
26081 Via Pera
Mission Viejo, CA 92691

Table 9
HIGHEST FOUR DAILY MAXIMUM 8-HOUR CO (PPM) AVERAGES

4 Highest Daily CO	2007	2008	2009
High	2.16	1.10	1.00
2nd High	1.99	1.04	0.89
3rd High	1.44	1.02	0.81
4th High	1.43	0.96	0.81
# Days above National Standard	0	0	0
# Days above State Standard	0	0	0

Source: California Air Resources Board, *ADAM Air Quality Data Statistics*, http://www.arb.ca.gov/adam/welcome.html.

The State and Federal standard for CO is 9.0 parts per million (ppm), averaged over eight hours. State and Federal standards were not exceeded between 2007 and 2009. On-road mobile source CO emissions have declined 24 percent between 1989 to 1998 despite a 23 percent rise in motor vehicle miles traveled (VMT) over the same 10 years. California trends have been consistent with national trends; CO emissions declined 20 percent in California from 1985 through 1997 while VMT increased 18 percent in the 1990's. Three major control programs have contributed to the reduced per-vehicle CO emissions: exhaust standards, cleaner burning fuels, and motor vehicle inspection and maintenance (I/M) programs. The data presented in Table 9 reinforces that CO emissions are well below State and Federal Standards.

Level 2. **Yes.** Was the area redesignated as "attainment" after the 1990 Clean Air Act? The proposed project is located in the South Coast Air Basin, under the jurisdiction of the SCAQMD, and was classified nonattainment after the 1990 FCAA. The South Coast Air Basin has been granted Federal redesignation to attainment/maintenance effective June 11, 2007.

Level 2a. Has "continued attainment" been verified with local Air District, if appropriate? **Yes.** As stated above, the South Coast Air Basin has been recently redesignated as an attainment/maintenance area for the Federal CO standards effective June 11, 2007. Additionally, the Mission Viejo Monitoring Station has not recorded an exceedance for CO in the past three years.

This concludes Figure 3 – Part 1. The flowchart continues with Figure 3 – Part 2 (Local CO Analysis) at Level 7.

Level 7. Does the project worsen air quality? **No.** Although the Basin is designated as an attainment/maintenance area for CO, it is necessary to determine project contributions to local air quality. Intersections where air quality may be getting worse are of primary concern. Section 4.7.1 of the *CO Protocol* provides criteria to determine whether a project is likely to worsen air quality. These criteria include increases in vehicles operating in cold start mode, increases in traffic volumes, and a worsening of traffic flow.

As previously stated in Table 8, implementation of the proposed project would alleviate several peak hour mainline and freeway ramp deficiencies and would reduce congestion. Additionally, the proposed project does not involve parking lots, and therefore would not increase the number of vehicles operating in cold

start mode. As a result, the proposed project has sufficiently addressed the CO impact and no further analysis is needed.

Alternative 3

Alternative 3 would follow the same path as Alternative 2 in the CO Protocol's conformity requirement decision flowcharts. Additionally, Alternative 3 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2, thereby resulting in similar CO emissions. Thus, the impacts of Alternative 3 would be less than significant.

Alternative 4

Alternative 4 has similar improvements as Alternative 2 and Alternative 3. As with Alternative 3, Alternative 4 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2, thereby resulting in similar CO emissions. Thus, CO hot-spot impacts of Alternative 4 would be less than significant.

5.4 REGIONAL ANALYSIS

Alternative 1 (No Build)

Alternative 1 (No Build) proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits. As a result, Alternative 1 would not require a regional analysis analyzing the proposed project's consistency with regional plans.

Alternative 2

The *2008 Regional Transportation Plan: Making the Connections* (RTP) is the culmination of a three-year effort with a focus on improving the balance between land use and the current/future transportation systems. SCAG is required to develop, maintain, and update the RTP on a three-year cycle. The RTP provides the basic policy and program framework for long-term investment in Southern California's vast regional transportation system in a coordinated, cooperative, and continuous manner. The proposed project is included in the RTP (RTP ID 2H01143); refer to Appendix B (Conformity Sheets).

> *INTERSTATE 5 FROM COAST HIGHWAY TO AVENIDA PICO – ADD 1 HOV LANE EACH DIRECTION*

Transportation projects in the SCAG region that receive State or Federal transportation funds must be consistent with the RTP and must be included in the Regional Transportation Improvement Program when ready for funding. The 2008 *Final Regional Transportation Improvement Program* (RTIP) is a capital listing of all transportation projects proposed over a six-year period for the SCAG.[8] The projects include highway improvements, transit, rail and bus facilities, high occupancy vehicle lanes, signal synchronization, intersection improvements, freeway ramps, etc. These projects constitute a large investment of public funds. The proposed project is included in the RTIP (RTIP ID ORA990929) under the following description (also refer to Appendix B).

> *I-5 AT AVENIDA PICO TO PACIFIC COAST HIGHWAY – ADD 1 HOV LANE IN EACH DIRECTION AND AVENIDA PICO INTERCHANGE IMPROVEMENT EA#0F960K, 2M0714*

[8] Southern California Association of Governments, http://www.scag.ca.gov/rtp2008/, November 2009.

The RTP specifies a detailed set of investments and strategies throughout the region to maintain, manage, and improve surface transportation. The RTP must be based on a realistic forecast of future revenues, and the included projects must help improve regional air quality. The RTP provides the basic policy and program framework for long-term investment in our vast regional transportation system in a coordinated, cooperative, and continuous manner. The proposed project's RTIP listing is in the process of being updated. Therefore, the proposed project's RTIP description will be amended to adjust the postmiles. The proposed project would conform to the SIP once the amendment has been incorporated into the RTIP. These modifications do not represent a significant change to the design concept and scope. Therefore, the proposed project would be in conformance with the RTIP and RTP.

A consistency analysis determination plays an essential role in local agency project review by linking local planning and unique individual projects to the AQMP in the following ways: it fulfills the CEQA goal of fully informing local agency decision makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are fully addressed, and it provides the local agency with ongoing information, assuring local decision makers that they are making real contributions to clean air goals defined in the most current AQMP (adopted 2007). Because the AQMP is based on projections from local General Plans, projects that are consistent with the local General Plan are generally considered consistent with the AQMP. The implementation of the proposed project would also not delay timely implementation of the Transportation Control Measures identified in the AQMP. As previously discussed, the proposed project would not significantly contribute to or cause deterioration of existing air quality; therefore, mitigation measures are not required for the long-term operation of the proposed project.

Alternative 3

Although Alternative 3 involves slightly different modifications to what is proposed in Alternative 2, Alternative 3 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2. As a result, Alternative 3 would constitute a project of the same magnitude as Alternative 2. Alternative 3 is consistent with the project defined in the RTP (RTP ID 2H01143) and the RTIP (RTIP ID ORA990929). Additionally, the proposed project would not significantly contribute to or cause deterioration of the existing air quality. Therefore, a less than significant impact would occur and mitigation measures are not required.

Alternative 4

Although Alternative 4 involves slightly different modifications to what is proposed in Alternative 2, Alternative 4 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2. As a result, Alternative 4 would constitute a project of the same magnitude as Alternative 2. Alternative 4 is consistent with the project defined in RTP (RTP ID 2H01143) and the RTIP (RTIP ID ORA990929). Additionally, the proposed project would not significantly contribute to or cause deterioration of the existing air quality. Therefore, a less than significant impact would occur and mitigation measures are not required.

5.5 DIESEL PARTICULATE MATTER EXHAUST

Alternative 1 (No Build)

Alternative 1 (No Build) proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits. As a result, no modifications to I-5 would occur and there would be no impacts regarding diesel particulate matter exhaust.

Alternative 2

Diesel particulate matter is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is commonly found throughout the environment and is estimated by the EPA's National Scale Assessment to contribute to the human health risk. Diesel exhaust is composed of two phases, either gas or particle, and both phases contribute to the risk. The gas phase is composed of many of the urban hazardous air pollutants, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde, and polycyclic aromatic hydrocarbons. The particle phase also has many different types of particles that can be classified by size or composition. The size of diesel particulates that are of greatest health concern are those that are in the categories of fine and ultra fine particles. The composition of these fine and ultra fine particles may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals, and other trace elements. Diesel exhaust is emitted from a broad range of diesel engines: the on-road diesel engines of trucks, buses, and cars, and off-road diesel engines that include locomotives, marine vessels, and heavy-duty equipment.

While there may possibly be diesel toxics emissions from the construction of a transportation project, the current scientific knowledge on diesel toxics is simply inadequate for conducting any meaningful quantitative assessment. FHWA issued an *Interim Guidance on Air Toxic Analysis in NEPA Documents*. It points out that ". . . air toxics analysis is an emerging field, and current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts that would result from a transportation project in a way that would be useful to decision-makers."[9] The FHWA interim guidelines are used as a reference tool only.

The FHWA interim guidance suggests a number of mitigation measures for diesel toxics emissions from project construction. These measures can be summarized into three categories: (1) operational agreements, such as changing work shifts and reducing unnecessary engine idling; (2) technological adjustments and retrofits, such as particulate matter traps and oxidation catalysts; and (3) use of clean fuels, such as ultra-low sulfur diesel. However, it should be noted that with the current absence of any statewide or local regulation, Caltrans does not have the legal authority to require construction contractors to undertake any of these measures. It may only be possible for Caltrans to request that some of these measures be employed, on a case-by-case basis. However, when working with the contractors on this construction project, efforts would be undertaken to minimize diesel toxic emissions to the extent feasible.

Alternative 3

Alternative 3 has similar improvements to Alternative 2. As a result, Alternative 3 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2. As with Alternative 2, Alternative 3, would improve traffic operations in the area and maximize overall performance within the project limits. Therefore, the proposed project would have less than significant impacts regarding diesel particulate matter.

Alternative 4

Alternative 4 has similar improvements to Alternative 2 and Alternative 3. Therefore, Alternative 4 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2. As with Alternative 2 and Alternative 3, Alternative 4 would improve traffic operations in the area and maximize overall performance within the project limits. Therefore, the proposed project would have less than significant impacts regarding diesel particulate matter.

[9] FHWA memorandum from Cynthia Burbank to Division Administrators, Feb. 3, 2006, page 4.

5.6 MOBILE SOURCE AIR TOXICS

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Federal Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, *66 FR 17229* (March 29, 2001). This rule was issued under the authority in Section 202 of the Federal Clean Air Act. In its rule, the EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Even if VMT increases by 145 percent as assumed between years 1999 and 2050 (refer to Exhibit 7 [VMT vs. MSAT Emissions]), FHWA projects would reduce on-highway emissions by an average of 72 percent. Thus, the EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to control MSATs.

The EPA is preparing a subsequent rule under the authority of Section 202(l) of the Federal Clean Air Act that would address these issues and make adjustments to the primary and secondary MSATs. Depending on the specific project circumstances, FHWA has identified three tiers of analysis:

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

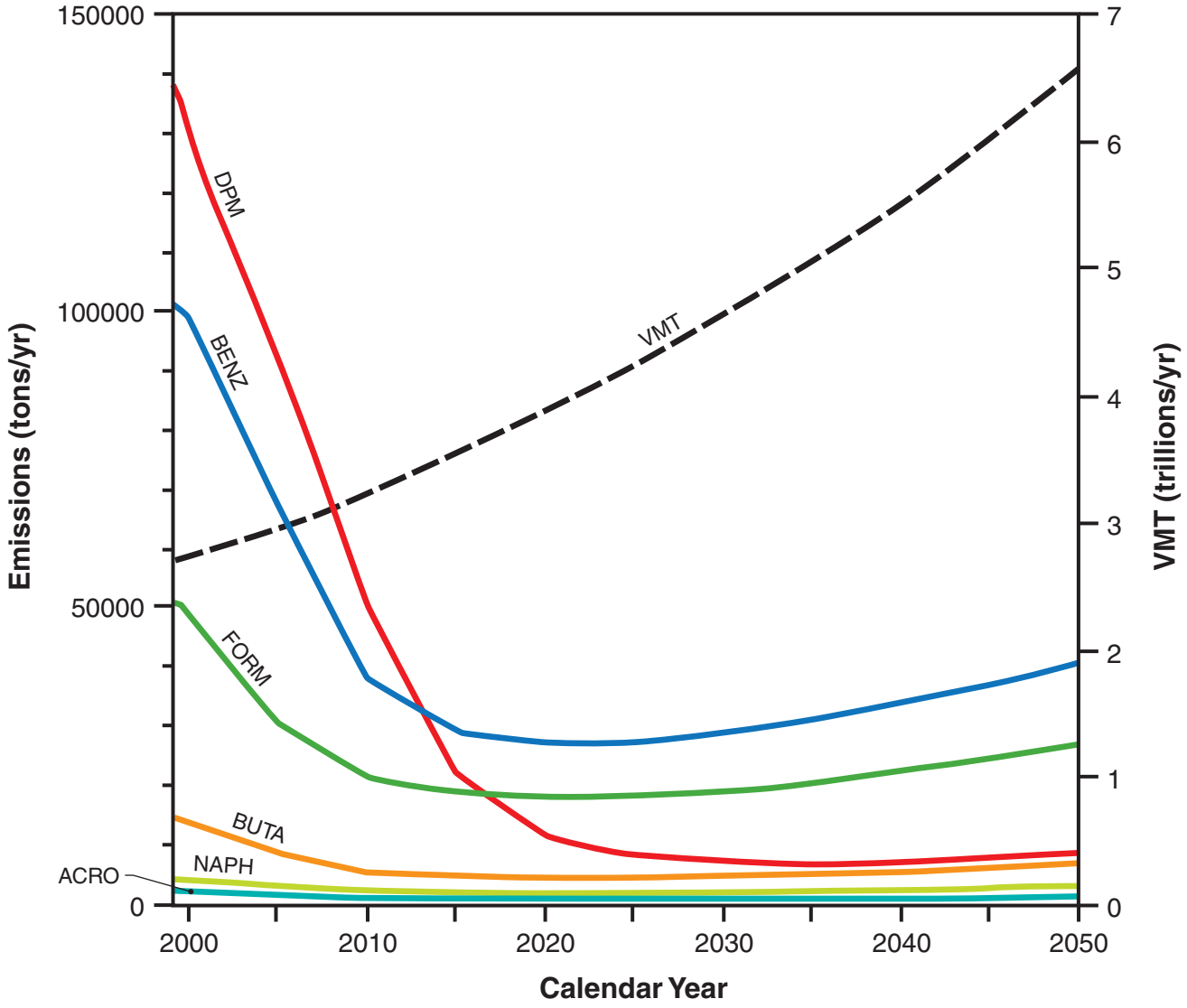
Alternative 1 (No Build)

Alternative 1 (No Build) proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits. As a result, no modifications to I-5 would occur and there would be no impacts regarding mobile source air toxics.

Alternative 2

The proposed project would improve vehicular traffic and circulation and would not create a facility that is likely to meaningfully increase MSATs. However, the proposed project involves traffic volumes where ADTs are currently greater than 150,000. As a result, a quantitative analysis for projects with higher potential MSAT effects (Tier 3) is provided below.

National Mobile Source Air Toxics Emissions Trends 1990-2050



LEGEND

- DPM - Diesel PM
- BENZ - Benzene
- FORM - Formaldehyde
- BUTA - 1,3-Butadiene
- NAPH - Naphthalene
- ACRO - Acrolein
- VMT - Vehicle-Miles Traveled

Notes: (1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.

(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009. *http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm*

Incomplete or Unavailable Information for Project Specific MSAT Health Impacts Analysis

According to FHWA, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT emissions. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects".[10] Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents*. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations[11] or in the future as vehicle emissions substantially decrease[12].

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's EMFAC2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in a National Cooperative Highway Research Board (NCHRP) study[13], which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near

[10] U.S. Environmental Protection Agency, *Integrated Risk Information System (IRIS),* January 2010. http://www.epa.gov/ncea/iris/index.html

[11] Health Effects Institute, *Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects*, January 2007. http://pubs.healtheffects.org/view.php?id=282

[12] Health Effects Institute, *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects*, May 2009. http://pubs.healtheffects.org/view.php?id=306

[13] U.S. Environmental Protection Agency, *Technology Transfer Network Support Center for Regulatory Atmospheric Modeling,* May 2009. http://www.epa.gov/scram001/dispersion_alt.htm#hyroad

uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with NAAQS for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI.[14] As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel particulate matter. The EPA[15] and the HEI[16] have not established a basis for quantitative risk assessment of diesel particulate matter in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

MSAT Emissions in the Project Area

As discussed above, there are several uncertainties that do not allow quantitative estimates of health effects from MSAT emissions in the project area. This analysis acknowledges that the proposed project may result in slightly increased exposure to MSAT emissions in certain locations compared to No Build conditions. However, the analysis shows that exposure to MSAT emissions in the future would not vary significantly between Build and No Build conditions. The concentrations and duration of exposures are

[14] Health Effects Institute, *Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects*, January 2007. http://pubs.healtheffects.org/view.php?id=282

[15] U.S. Environmental Protection Agency, *Risk Assessment Portal*, Accessed January 2009. http://www.epa.gov/risk/basicinformation.htm#g

[16] Health Effects Institute, *Summaries of Studies of Diesel Exhaust*, November 2007. http://pubs.healtheffects.org/getfile.php?u=395

uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated. However, one can examine MSAT emissions in the project area and estimate the relative impacts of MSAT emissions under different scenarios. In California, vehicle emissions are estimated using the EMFAC2007 program published by CARB. However, because EMFAC2007 does not calculate MSAT emissions, Caltrans and UC Davis have created CT-EMFAC which is an interpretation of the EMFAC2007 model to include additional emission factors and emissions of MSATs. CT-EMFAC simplifies the process of getting composite emission factors and extends EMFAC to include the priority mobile source air toxics, which otherwise require off-model speciation of Total Organic Gases (TOG) when the standard EMFAC model is used.

The emission factors from CT-EMFAC are pollutant emissions in grams per mile of vehicle travel. Multiplying these emission factors by the number of vehicle miles traveled (VMT) in the project area provides an estimate of the total emissions from vehicles traveling through the project area. For the purposes of the following MSAT analysis, VMT for 2040 No Build and 2040 Build scenarios were based on the traffic volumes and VMT data provided by Austin-Foust Associates; refer to Table 10 (Daily and Peak Hour Vehicle Miles Traveled on I-5). Vehicle emissions vary by speed. Therefore, emissions are higher on a grams per mile basis for slower speeds. For some pollutants, including MSATs, emissions increase with speed at speeds greater than 50 miles per hour (mph). Therefore, MSAT emissions were modeled based on the vehicle speeds associated with the freeway mainline LOS data presented in the Traffic Study prepared by Austin-Foust Associates.

Table 10
DAILY AND PEAK HOUR VEHICLE MILES TRAVELED ON I-5

Roadways	Scenario	
	No Build	Build
AM Peak Hour VMT		
Freeways, Toll Roads, and Ramps	439,028.0	431,777.6
High Occupancy Vehicle Lanes	39,771.8	46,456.0
Arterials	336,799.9	335,121.6
Total	815,559.7	813,355.2
PM Peak Hour VMT		
Freeways, Toll Roads, and Ramps	466,737.5	461,092.7
High Occupancy Vehicle Lanes	41,287.1	48,972.1
Arterials	350,267,3	349,554.5
Total	858,291.9	859,619.3
Daily VMT		
Freeways, Toll Roads, and Ramps	6,244,871.9	6,148,444.0
High Occupancy Vehicle Lanes	570,444.7	674,662.6
Arterials	3,993,762.2	3,987,267.0
Total	10,809,078.8	10,810,373.6
VMT = Vehicle Miles Traveled		
Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.		

Table 11 (Build and No Build Emissions on I-5) presents the estimated MSAT emissions from traffic on I-5; refer to Appendix C (EMFAC Model Run). The data indicates that MSAT emissions would not vary significantly between future Build and No Build conditions. As depicted in Table 11, emissions would not change for most MSATs. However, Butadiene and Benzene would decrease slightly during build conditions. This may be attributed to an improvement in vehicle speeds and an overall decrease in peak hour VMT.

Table 11
BUILD AND NO BUILD EMISSIONS ON I-5

Mobile Source Air Toxins	No Build (pounds)	Build (pounds)
Diesel Particulate Matter	34.47	34.47
Formaldehyde	21.75	21.75
Butadiene	4.90	4.88
Benzene	25.35	21.64
Acrolein	1.11	1.11
Acetaldehyde	7.01	7.01

Source: California Department of Transportation and University of California, Davis, *CT-EMFAC*, 2007. Based on traffic data provided by Austin-Foust Associates, Inc.

CARB has found that DPM poses the greatest cancer risks among all identified air toxics. Diesel trucks contribute more that half of the total diesel combustion sources. However, CARB has adopted a Diesel Risk Reduction Plan (DRRP) with control measures that would reduce the overall DPM emissions by approximately 85 percent from 2000 to 2020. These reduction measures are not reflected in the CT-EMFAC emission factors used in the analysis above. Therefore, future DPM emissions would be reduced beyond what is indicated in Table 11. In addition, total toxic risk from diesel exhaust may only be exposed for a much shorter duration. Further, DPM is only one of many environmental toxics, and those of other toxics and other pollutants in various environmental media may overshadow its cancer risks. Thus, while diesel exhaust may pose potential cancer risks, most receptors' short-term exposure would cause only minimal harm, and these risks would also greatly diminish in the future operating years of the proposed project due to planned emission control regulations.

Alternative 3

Alternative 3 would have slightly different ramp modifications on the Camino Capistrano (Stonehill Drive) ramp and would not modify the Valle Road (San Juan Creek Road) ramp. However, Alternative 3 would not change the traffic volumes, fleet mixes, or level of service beyond what was analyzed in Alternative 2. As with Alternative 2, Alternative 3, would improve traffic operations in the area and maximize overall performance within the project limits by minimizing weaving conflicts and maintaining HOV lane speeds. Therefore, the proposed project would result in MSAT emissions that would be consistent with what was projected for Alternative 2.

Alternative 4

Alternative 4 has similar improvements as Alternative 2 and Alternative 3; however, Alternative 4 does not propose a buffer, as opposed to the four-foot buffer proposed in Alternatives 2 and 3. Additionally, Alternative 4 would provide a standard 10-foot median shoulder for the northern portion of the compound curve. As a result, Alternative 4 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2. Alternative 4 would improve traffic operations in the area and maximize overall performance within the project limits by minimizing weaving conflicts and maintaining HOV lane speeds as indicated in Alternative 2 and Alternative 3. Therefore, the proposed project would result in MSAT emissions that would be consistent with what was projected for Alternative 2.

5.7 NATURALLY OCCURRING ASBESTOS/STRUCTURAL ASBESTOS

Chrysotile and amphibole asbestos (such as tremolite) occur naturally in certain geologic settings in California, most commonly in association with ultramafic rocks and along associated faults. Asbestos is a

known carcinogen and inhalation of asbestos may result in the development of lung cancer or mesothelioma. The asbestos contents of many manufactured products have been regulated in the U.S. for a number of years. For example, CARB has regulated the amount of asbestos in crushed serpentinite used in surfacing applications, such as for gravel on unpaved roads, since 1990. In 1998, new concerns were raised about possible health hazards from activities that disturb rocks and soil containing asbestos and may result in the generation of asbestos laden dust. These concerns recently lead CARB to revise their asbestos limit for crushed serpentinite and ultramafic rock in surfacing applications from 5 percent to less than 0.25 percent, and to adopt a new rule requiring best practices dust control measures for activities that disturb rock and soil containing naturally occurring asbestos.

Alternative 1 (No Build)

Alternative 1 (No Build) proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits. As a result, no modifications to I-5 would occur and there would be no impacts regarding natural occurring asbestos/structural asbestos.

Alternative 2

The California Division of Mines and Geology (CDMG) Geological Map Index was searched for available geological maps, which cover the project study area and surrounding areas. These geological maps indicate geological formations, which are overlaid on a topographic map. Some maps focus on specific issues (i.e., bedrock, sedimentary rocks, etc.), while others may identify artificial fills (including landfills). Geological maps can be effective in estimating permeability and other factors that influence the spread of contamination. According to the California Division of Mines and Geology maps,[17,18] the project study area is generally in an urban land area and underlain by a stratified sequence from the Quaternary Period and consists of alluvial floodplain deposits. Additionally, according to the CDMG document entitled *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos Report* (August 2000), the proposed project is not located in an area where naturally occurring asbestos is likely to be present.

Naturally Occurring Asbestos (NOA) in bedrock is typically associated with serpentine and peridotite deposits. Note that during demolition activities, the likelihood of encountering structural asbestos is low due to the nature of the demolished materials. The material would consist of concrete and metal piping. Therefore, the potential for NOA to be present within the project limits is considered to be low. Furthermore, prior to the commencement of construction, qualified geologists would further examine the soils and makeup of the existing structure. Should the project geologist encounter asbestos during the analysis, proper steps shall be executed to handle the materials.

Alternative 3

Alternative 3 would occur in the same location as Alternative 2. As a result, the potential for impacts associated with asbestos is low. Therefore a less than significant impact would occur in this regard.

[17] California Division of Mines and Geology, *Geological Map of the Dana Point 7.5' Quadrangle, Orange County, California*, 1999.

[18] California Division of Mines and Geology, *Geological Map of the San Clemente 7.5' Quadrangle, Orange County, California*, 1999.

Alternative 4

Alternative 4 would occur in the same location as Alternative 2 and Alternative 3. As a result, the potential for impacts associated with asbestos is low. Therefore a less than significant impact would occur in this regard.

5.8 GLOBAL CLIMATE CHANGE

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy have increased dramatically in recent years. These efforts are primarily concerned with the emissions of GHG related to human activity that include carbon dioxide (CO_2), methane, nitrous oxide, tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23 (fluoroform), HFC-134a (1, 1, 1, 2 – tetrafluoroethane), and HFC-152a (difluoroethane).

In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and pro-active approach to dealing with greenhouse gas (GHG) emissions and climate change at the State level. AB 1493 requires CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year; however, in order to enact the standards California needed a waiver from the EPA. The waiver was denied by the EPA in December 2007 (see California v. Environmental Protection Agency, 9th Cir. Jul. 25, 2008, No. 08-70011). On January 26, 2009, it was announced that the EPA would reconsider their decision regarding the denial of California's waiver. On May 18, 2009, President Barack Obama announced the enactment of a 35.5 mile per gallon (mpg) fuel economy standard for automobiles and light duty trucks which would take effect in 2012. This standard is the same that was proposed by California.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce GHG emissions to: 1) 2000 levels by 2010, 2)1990 levels by 2020, and 3) 80 percent below 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms and rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the State's Climate Action Team.

With Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Climate change and GHG reduction is also a concern at the Federal level. California, in conjunction with several environmental organizations and several other states, sued to force the EPA to regulate GHGs as a pollutant under the Clean Air Act (*Massachusetts vs. Environmental Protection Agency et al.*, U.S. Supreme Court No. 05–1120. 549). The court ruled that GHGs do fit within the Clean Air Act's definition of a pollutant, and that EPA does have the authority to regulate GHGs. As a result, the EPA has taken steps to implement guidelines which are being circulated in the Federal register. In March 2009, the EPA released a proposed Mandatory Greenhouse Gas Reporting Rule for facilities that emit 25,000 metric tons of greenhouse gases annually.

Individual projects do not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may participate in a potential impact through its incremental contribution combined with the contributions of all other sources of GHG. In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (refer to CEQA Guidelines sections 15064(i)(1) and 15130). To make this determination, the incremental impacts of the proposed project must be compared with the effects of past, current, and probable future projects.

As part of its supporting documentation for the Draft Scoping Plan, CARB recently released an updated version of the GHG inventory for California (June 26, 2008). Exhibit 8 (California GHG Inventory and Vehicle CO_2 Emissions vs. Speed) includes a graph from that update that shows the total GHG emissions for California for 1990, 2002-2004 average, and 2020 projected if no action is taken. Caltrans and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation[19], Caltrans has created and is implementing the Climate Action Program at Caltrans that was published in December 2006.[20]

PROJECT ANALYSIS

One of the main strategies in the Caltrans Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of CO_2 from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 [mph] miles per hour) and speeds over 55 mph; the most severe emissions occur from 0-25 mph (refer to Exhibit 8). 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.

Alternative 1 (No Build)

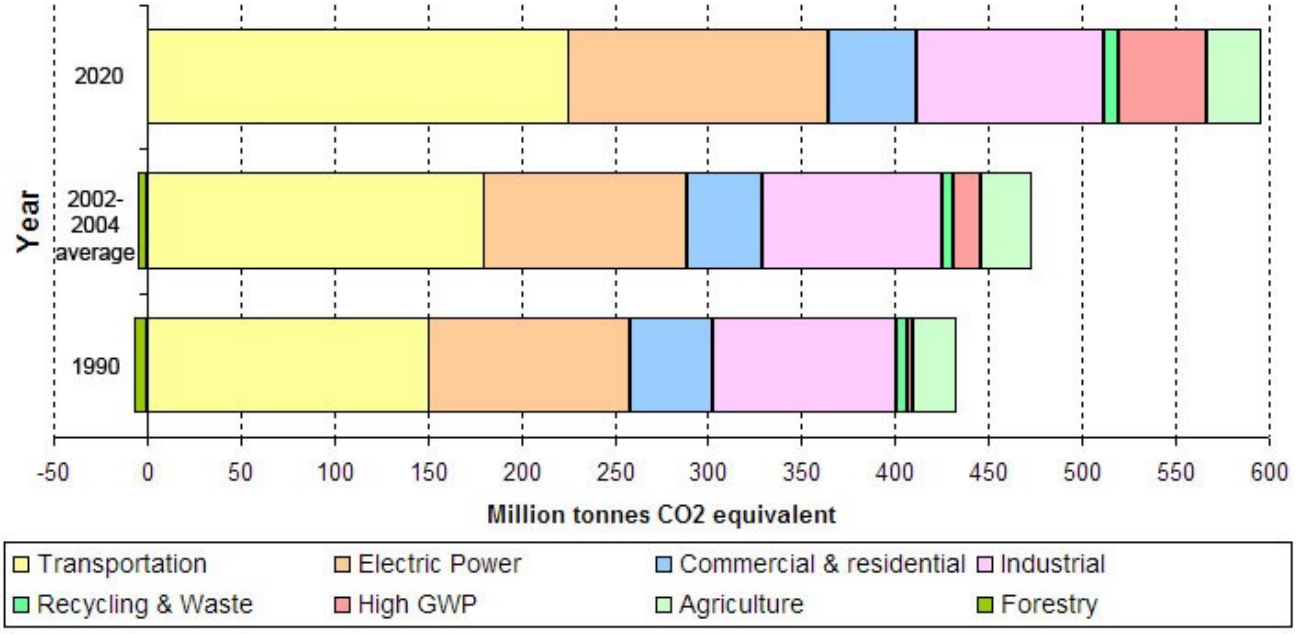
Alternative 1 (No Build) proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits. As a result, no modifications to I-5 would occur and there would be no impacts global climate change.

Alternative 2

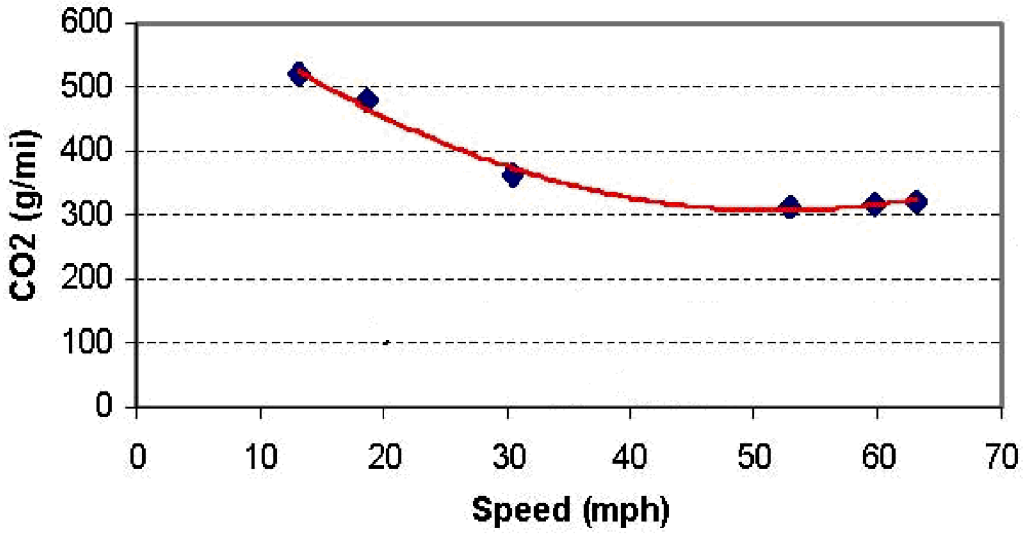
Based on the traffic data provided by Austin-Foust Associates, ADT along the project portion of I-5 would range from 246,000 to 300,000 during the No Build scenario and 254,000 to 300,000 during the Build scenario. As a result, daily vehicle miles traveled (VMT) would be 10,809,078.8 during the No Build scenario and 10,810,373.6 during the Build scenario. As shown in Table 12 (Vehicle Miles Traveled Summary), implementation of the proposed project would result in a net increase of VMT by 1,294.8. This VMT increase would occur within the HOV lanes, while the freeways, toll roads, ramps, and arterials would experience a VMT decrease.

[19] California Department of Transportation, *Climate Action Program at Caltrans*, December 2006.
[20] Ibid.

California GHG Inventory Forecast



Fleet CO2 Emissions vs. Speed (Highway)



Source: Center for Clean Air Policy— http://www.ccap.org/Presentations/Winkelman%20TRB%202004%20(1-13-04).pdf

California GHG Inventory and Vehicle CO_2 Emissions vs. Speed

Table 12
VEHICLE MILES TRAVELED SUMMARY

Roadways	Scenario		Difference
	No Build	Build	
Freeways, Toll Roads, and Ramps	6,244,871.9	6,148,444.0	-96,427.9
High Occupancy Vehicle Lanes	570,444.7	674,662.6	104,217.9
Arterials	3,993,762.2	3,987,267.0	-6,495.2
Total	10,809,078.8	10,810,373.6	1,294.8
VMT = Vehicle Miles Traveled			
Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.			

Table 13 (Vehicle Hours Traveled Summary), compares the vehicle hours traveled (VHT) between the no build and build scenarios. VHT represents the total number of hours spent traveling in vehicles. As shown in Table 13, implementation of the build scenario would result in an overall decrease in VHT. Although the VHT would increase for the HOV lanes, the freeways, toll roads, ramps, and arterials would experience a VHT decrease. The HOV lane system is used as a strategy to maximize the people-carrying capacity of the freeways. Therefore the net reduction in VHT can be attributed to the increase in high occupancy vehicle trips and a reduction in single occupancy vehicle trips.

Table 13
VEHICLE HOURS TRAVELED SUMMARY

Roadways	Scenario		Difference
	No Build	Build	
Freeways, Toll Roads, and Ramps	99,328.4	97,866.6	-1,461.8
High Occupancy Vehicle Lanes	8,788.8	9,798.9	1,010.1
Arterials	111,656.3	111,489.0	-167.3
Total	219,773.5	219,154.5	-619.0
VHT = Vehicle Hours Traveled			
Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.			

Table 14 (Annual Greenhouse Gas Emissions) depicts the estimated 2040 emissions from vehicles traveling within the project limits assuming an average vehicle speed of 65 miles per hour. Refer to Appendix C (EMFAC Model Run) for the emissions factors used to calculate the proposed project's greenhouse gas emissions. Based on the year 2040 No Build VMT data, GHG emissions would result in 4,704.95 metric tons of carbon dioxide equivalent per year ($MTCO_2$/yr) while emissions based on 2040 Build VMT data would result in 4,705.58 $MTCO_2$/yr. Although 2040 Build conditions would result in a net increase of 0.63 $MTCO_2$/yr over No Build conditions, it should be noted that the CT-EMFAC model run does not account for the improved traffic flow conditions that would occur under 2040 Build conditions. As stated above, emissions decline as speed increases. The proposed project would provide continuity of the I-5 mainline HOV network and maximize overall performance within the project limits. Extending the HOV lane would maintain travel speeds and minimize weaving conflicts that occur at the termini of the HOV lanes. For these reasons, and considering further emissions improvements under AB 1493, CO_2 emissions for the Build conditions would most likely be less than the No Build conditions. Furthermore, as discussed previously in Table 8, the improvement of freeway mainline and ramp LOS indicates an improvement in traffic flow.

Table 14
ANNUAL GREENHOUSE GAS EMISSIONS

Scenario	CO_2[1] metric tons/year
No Build	4,704.95
Build	4,705.58
Net Change	*0.63*

VMT = vehicle miles traveled; CO_2 = carbon dioxide; $MTCO_2eq/yr$ = metric tons of carbon dioxide equivalents per year;

Notes:
1. Emissions calculated using CT-EMFAC.
2. VMT based on traffic volumes provided by Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Traffic Study*, December 2009.

Construction Emissions

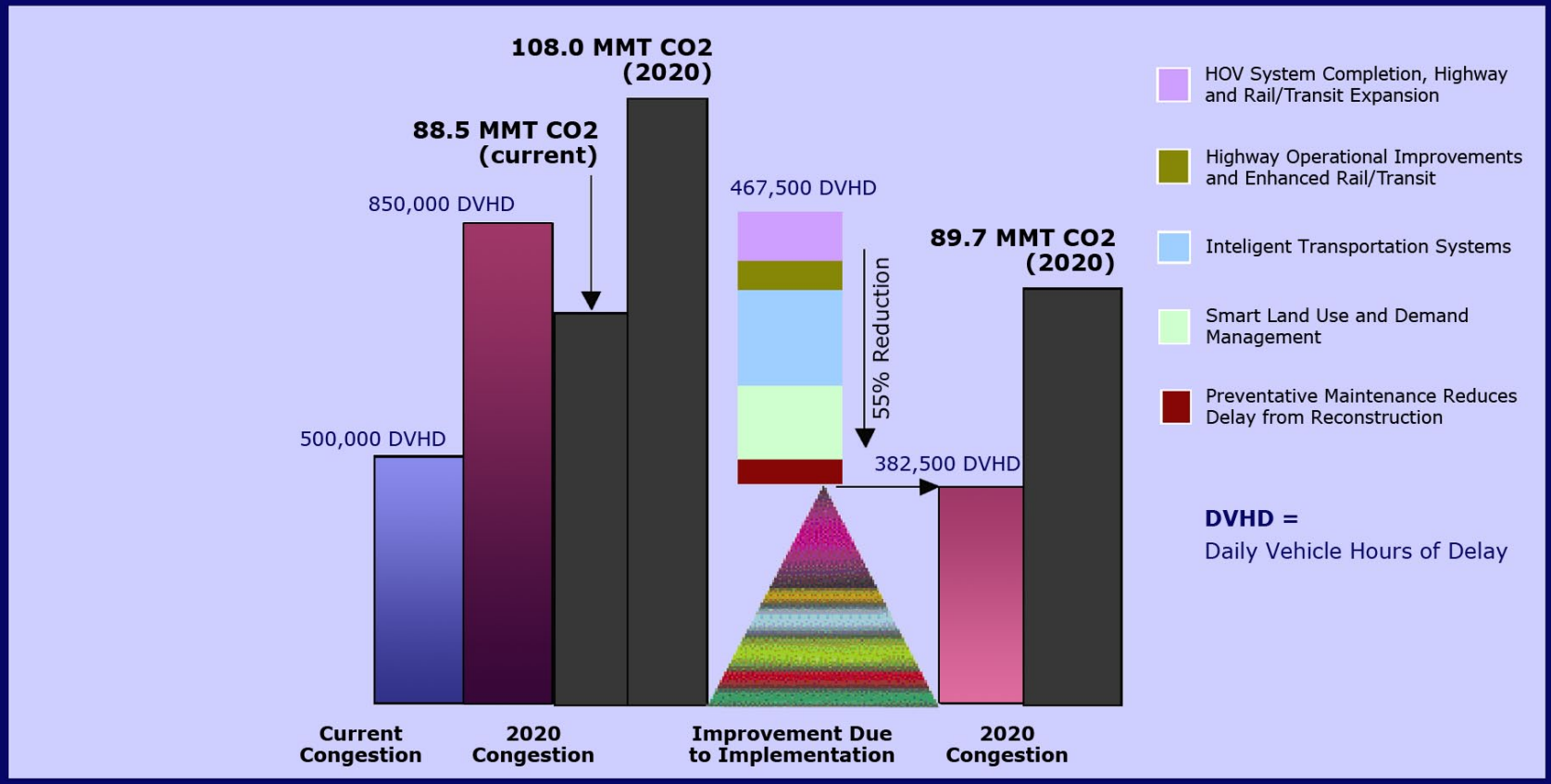
GHG emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction GHG emissions include emissions produced as a result of: material processing, on-site construction equipment, and traffic delays due to construction. These emissions would 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 increasing pavement durability, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be mitigated to some degree by longer intervals between maintenance and rehabilitation events. The proposed project would comply with any State, Federal, and/or local rules and regulations developed as a result of implementing control and mitigation measures proposed as part of their respective SIPs.

Assembly Bill 32 Compliance

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement the Governor's Executive Orders and help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Governor Schwarzenegger's Strategic Growth Plan calls for a $238.6 billion infrastructure improvement program to fortify the state's transportation system, education, housing, and waterways, including $100.7 billion in transportation funding through 2016.[21] As shown on Exhibit 9 (Outcome of the Strategic Growth Plan) the Strategic Growth Plan targets a significant decrease in traffic congestion below today's level and a corresponding reduction in GHG emissions. Furthermore, the Strategic Growth Plan proposes to do this while accommodating growth in population and the economy. A suite of investment options has been created that combined together yield the promised reduction in congestion. The Strategic Growth Plan relies on a complete systems approach of a variety of strategies: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements.

[21] California Office of the Governor, *The California Strategic Growth Plan,* 2008. (http://gov.ca.gov/pdf/gov/CSGP.pdf)

Outcome of Strategic Growth Plan



Conceptual Framework for Reducing Congestion that Needs to be Verified Through Experience

*** Numbers reflect SHWY system**

As part of the *Climate Action Program at Caltrans*, Caltrans is supporting efforts to reduce VMT by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Although Caltrans does not have local land use planning authority, Caltrans is working closely with local jurisdictions on planning activities. Additionally, Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks by supporting on-going research efforts at universities, by supporting legislative efforts to increase fuel economy, and by its participation on the California Climate Action Team. It should be noted that control of the fuel economy standards is held by EPA and CARB. Lastly, the use of alternative fuels is also being considered as Caltrans is participating in funding for alternative fuel research at UC Davis. Table 15 (Caltrans Climate Change Strategies) summarizes statewide efforts that Caltrans is implementing in order to reduce GHG emissions.

Table 15
CALTRANS CLIMATE CHANGE STRATEGIES

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings (MMT)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies and other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	0.975	7.8
Operational Improvements and Intelligent Trans. System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	0.007	2.17
Mainstream Energy and GHG into Plans and Projects	Office of Policy Analysis and Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational and Information Program	Office of Policy Analysis and Research	Interdepartmental, Cal EPA, CARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening and Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	0.0045	0.0065 0.45 0.0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	0.117	0.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5 percent limestone cement mix	1.2	4.2
				25 percent fly ash cement mix	0.36	3.6
				> 50 percent fly ash/slag mix	Not Estimated	Not Estimated

Table 15 (continued)
CALTRANS CLIMATE CHANGE STRATEGIES

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings (MMT)	
		Lead	Agency		2010	2020
Goods Movement	Office of Goods Movement	Cal EPA, CARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.67

ITS = Intelligent Transportation Systems; Cal EPA = California Environmental Protection Agency; CARB = California Air Resources Board; CEC = California Energy Commission; MPO = Metropolitan Planning Organization; BT&H = Business, Transportation & Housing Agency

Source: California Department of Transportation, *Climate Action Program at Caltrans*, December 2006.

Adaptation Strategies

"Adaptation strategies" refer to how Caltrans and others can 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, storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damaging roadbeds by longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

Climate change adaptation must also involve the natural environment as well. Efforts are underway on a statewide-level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. The results of these efforts help California agencies plan and implement mitigation strategies for programs and projects. On November 14, 2008, Governor Schwarzenegger signed Executive Order S-13-08 which directed a number of State agencies to address California's vulnerability to sea level rise caused by climate change. The Natural Resources Agency, (Resources Agency), through the interagency Climate Action Team, was directed to coordinate with local, regional, State and federal public and private entities to develop the *2009 California Climate Adaptation Strategy* (Climate Adaptation Strategy). The Climate Adaptation Strategy was adopted December 2, 2009 and summarizes the best known science on climate change impacts to California, assess California's vulnerability to the identified impacts and then outline solutions that can be implemented within and across state agencies to promote resiliency. As part of its development of the Climate Adaptation Strategy, Resources Agency was directed to request the National Academy of Science to prepare a *Sea Level Rise Assessment Report* by December 2010 to advise how California should plan for future sea level rise. The report is to include:

- Relative sea level rise projections for California, taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates;
- The range of uncertainty in selected sea level rise projections;
- A synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities, and beaches), natural areas, and coastal and marine ecosystems; and
- A discussion of future research needs regarding sea level rise for California.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is an active participant in the efforts being conducted as part of Governor's Schwarzenegger's Executive Order on Sea Level Rise and is mobilizing to be able to respond to the National Academy of Science report on *Sea Level Rise Assessment*. Currently, Caltrans is working to assess which transportation facilities are at greatest risk from climate change effects. However, without statewide planning scenarios for relative sea level rise and other climate change impacts, Caltrans has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once statewide planning scenarios become available, Caltrans will be able review its current design standards to determine what changes, if any, may be warranted in order to protect the transportation system from sea level rise.

According to the IPCC report, *Climate Change 2007: The Physical Science Basis: Summary for Policymakers* (February 2007), there is no doubt that the climate system is warming. Global average air and ocean temperatures as well as global average sea level are rising. Of the 12 years preceding 2007, 11 years have ranked as among the warmest on record since 1850. While some of the increase is explained by natural occurrences, the 2007 report asserts that the increase in temperatures is very likely (> 90 percent) due to human activity, most notably the burning of fossil fuels. For California, similar effects are described in the California Climate Change Center report, *Our Changing Climate: Assessing the Risks to California* (July 2006). Based on projections using state-of-the-art climate modeling, the temperatures in California are expected to rise between 3 degrees Fahrenheit (ºF) to 10.5ºF by the end of the century depending on how much California is able to reduce its GHG emissions. Changes to the global climate system and ecosystems and to California would include, but would not be limited to:

- The loss of sea ice and mountain snow pack resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;[22]

- Rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps, the Greenland and Antarctic ice sheets;[23]

- Changes in weather that includes, widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic and aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;[24]

- Decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;[25]

- Increase in the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas of Los Angeles and the San Joaquin Valley by the end of the 21st century;[26] and

[22] Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis, Summary for Policymakers*, February 2007.

[23] Ibid.

[24] Ibid.

[25] California Environmental Protection Agency, *Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature (Executive Summary)*, March 2006.

[26] Ibid.

- High potential for erosion of California's coastlines and sea water intrusion into the Delta and levee systems due to the rise in sea level.[27]

The following climate change effects could affect the proposed I-5 HOV Lane Extension project. However, the type and degree of the impacts that climate change would have on humans and the environment is difficult to predict at the local scale.

- *Sea Level Rise*. According to the IPCC, climate change is expected to raise sea levels by up to four feet. The project area is at a coastal location and sea level rise of this magnitude could inundate portions of the local coastline. However, I-5 is elevated within the project limits, which would reduce the potential of inundation from higher sea levels. Additionally, the effects related to sea level rise are speculative at this time. If determined to be a significant threat, protective measures such as levees would likely be installed by regional and local governments to protect urbanized areas.

- *Natural Disasters*. Climate change could result in increased flooding and weather-related disasters. The southern portion of the proposed project is located within one mile of the Pacific Ocean and may be exposed to intense coastal storms. However, because the proposed project is a freeway, it would not be expected to sustain significant damage. The frequency of large floods on rivers and streams could also increase, which could affect the northern portion of the alignment near San Juan Creek. A portion of the project site is located adjacent to the 100-year flood zone, which could be flooded more frequently if the frequency of large storms increased. However, the proposed project does not include habitable structures and would not impede flood flows; thus, flood-related impacts would be less than significant even under an intensified flooding scenario.

- *Air quality*. Climate change would compound negative air quality impacts in the South Coast Air Basin, resulting in respiratory health impacts.[28] However, this would be a regional, not a project-specific effect. Moreover, as discussed above, the project's impacts on air quality were found to be less than significant.

Other predicted physical and environmental impacts associated with climate change include heat waves, alteration of disease vectors, biome shifts, impacts on agriculture and the food supply, reduced reliability in the water supply, and strain on the existing capacity of sanitation and water-treatment facilities. While these issues are a concern for society at large, none of these impacts would have a disproportionate effect on the implementation of the proposed project.

Conclusion

The proposed project is a transportation infrastructure project that would improve the circulation system for vehicular traffic in the project vicinity, reduce congestion and delay and associated pollutant emissions, and improve air quality in the area. As shown in Table 13, the proposed project would increase VMT within the HOV lanes, while the freeways, toll roads, ramps, and arterials would experience a VMT decrease. As a result, the proposed project Build conditions would result in a reduction in VHT and the improved traffic flow, thereby reducing GHG emissions. The improvement in operations compared to the No Build conditions, particularly higher speed and reduced VHT, has a beneficial impact on CO_2 emissions, which is consistent with the results for the analysis of the other criteria pollutants. The proposed project would result in a positive effect on the reduction of CO_2 levels. Furthermore, AB 1493 (requirement for further improvement in CO_2 emissions from motor vehicles

[27] Ibid.
[28] California Environmental Protection Agency, *AB 1493 Briefing Package*, 2008.

beginning in the 2009 model year) has not yet been incorporated by CARB into the EMFAC model. It is expected that future CO_2 levels would be lower than currently projected in Table 14 with implementation of AB 1493.

Additionally, the proposed project is programmed in the RTP (ID 2H01143) and the RTIP (ID ORA990929) and is therefore recognized as an improvement project that would improve transportation operations in the region. The proposed HOV lane extension would provide continuity of the I-5 mainline HOV network and maximize overall performance within the project limits. Extending the HOV lane would maintain travel speeds and minimize weaving conflicts that occur at the termini of the HOV lanes. The 2008 RTP includes programs, policies, and measures to address air emissions, including greenhouse gases. Measures that help mitigate air emissions, including GHG emissions, are comprised of strategies that reduce congestion, increase access to public transportation, improve air quality, and enhance coordination between land use and transportation decisions. SCAG's vision includes the introduction of a high-speed, high-performance regional transport system that may potentially reduce freeway congestion and provide an alternative to the single-occupancy automobile.

Alternative 3

Alternative 3 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2. Therefore, VMT, VHT, and CO_2 emissions would not be substantially different from what was analyzed in Alternative 2. Alternative 3 would increase VMT within the HOV lanes, while the freeways, toll roads, ramps, and arterials would experience a VMT decrease. As a result, Alternative 3 conditions would result in a reduction in VHT and the improved traffic flow would reduce greenhouse gas emissions.

Alternative 4

As with Alternative 3, Alternative 4 would not change the traffic volumes, fleet mixes, or level of service from what was analyzed in Alternative 2. Therefore, VMT, VHT, and CO_2 emissions would not be substantially different from what was analyzed in Alternative 2. Alternative 4 would increase VMT within the HOV lanes, while the freeways, toll roads, ramps, and arterials would experience a VMT decrease. As a result, Alternative 4 conditions would result in a reduction in VHT and the improved traffic flow would reduce greenhouse gas emissions.

5.9 CUMULATIVE IMPACTS RELATING TO AIR QUALITY

Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from vehicular traffic that can travel well out of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered would cover an even larger area. Accordingly, the cumulative analysis for a project's air quality analysis must be regional by nature.

Construction and operation of cumulative projects would further degrade the local air quality, as well as the air quality of the Basin. Air quality would be temporarily degraded during construction activities that occur separately or simultaneously. However, the greatest cumulative impact on the quality of regional air would be the incremental addition of pollutants from increased traffic from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with the construction of these projects. It should be noted that the proposed project is a transportation improvement, and not a direct trip generator.

With respect to emissions that may contribute to exceeding State and Federal standards, a CO and particulate matter screening analysis was performed. The results of this analysis illustrate that localized levels would not violate published air quality standards, and therefore does not present a significant cumulative impact. As stated above, implementation of the proposed project would improve traffic flow and congestion within the project limits of the I-5. Furthermore, although a VMT increase would occur within the HOV lanes, while the freeways, toll roads, ramps, and arterials would experience a VMT decrease. As a result, the project Build conditions would result in a reduction in VHT and the improved traffic flow would reduce GHG emissions.

6.0 STANDARD CONSTRUCTION PRACTICES

6.1 CONSTRUCTION IMPACTS

In addition to implementing all applicable Best Available Control Measures (BACMs) from SCAQMD Rule 403 (section [d2] and Table 1) and Rule 402, the following avoidance and minimization measures shall be utilized to reduce and otherwise address particulate emissions:

AQ1 During clearing, grading, earth moving, or excavation operations, excessive fugitive dust emissions shall be controlled by regular watering or other dust preventive measures using the following procedures, as specified in the SCAQMD's Rule 403.

- All material excavated or graded shall be sufficiently watered to prevent excessive amounts of dust. Watering shall 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, earth moving, or excavation operations shall be minimized so as to prevent excessive amounts of dust.
- Visible dust beyond the property line emanating from the project shall be prevented to the maximum extent feasible.
- These control techniques shall be indicated in project specifications.

AQ2 Project grading plans shall show the duration of construction. Ozone precursor emissions from construction equipment vehicles shall be controlled by maintaining equipment engines in good condition and in proper tune per manufacturer's specifications.

AQ3 All trucks that are to haul excavated or graded material on-site shall 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.

AQ4 The contractor shall adhere to Caltrans Standard Specifications for Construction (Sections 10 and 18 [Dust Control] and Section 39-3.06 [Asphalt Concrete Plant Emissions]).

AQ5 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 shall be implemented to remove ACMs.

6.2 OPERATIONAL IMPACTS

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

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7.0 REFERENCES

7.1 LIST OF PREPARERS

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14725 Alton Parkway
Irvine, California 95618
949/472-3505

Eddie Torres, INCE, REA, Air Quality Specialist, RBF Consulting. B.A. Environmental Analysis and Design, B.S. Mechanical Engineering, University of California, Irvine. M.S. Mechanical Engineering, University of Southern California. 10 years experience.

Contribution: Oversight and Preparation of the Air Quality Assessment.

Achilles Malisos, Air Quality Specialist, RBF Consulting, B.A. Environmental Studies, University of California, Santa Cruz. M.A. Urban and Regional Planning, University of California, Irvine. 5 years experience.

Contribution: Preparation of the Air Quality Assessment.

Brian Allee, Environmental Analyst, RBF Consulting, B.S. City and Regional Planning, California Polytechnic State University, San Luis Obispo. 2 years experience.

Contribution: Preparation of the Air Quality Assessment.

Gary Gick, Technical Editor, RBF Consulting, B.A. English, University of California, Los Angeles. 25 years experience.

Contribution: Technical Editing and Word Processing for the Air Quality Assessment.

Debby Hutchinson, Graphic Artist, RBF Consulting, A.A., Commercial Art, Orange Coast College. B.F.A. Illustration, California State University, Long Beach. 37 years experience.

Contribution: Preparation of the Graphics for the Air Quality Assessment.

7.2 DOCUMENTS

1. Austin-Foust Associates, Inc., *I-5 HOV Lane Extended PA/ED Existing and Future Traffic Volume Traffic* Study, December 2009.
2. California Department of Conservation Division of Mines and Geology, *A General Location Guide for Ultramific Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos, Open File Report 2000-19,* August 20, 2000.
3. California Environmental Protection Agency, *AB 1493 Briefing Package*, 2008.
4. California Environmental Protection Agency, C*limate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature (Executive Summary)*, March 2006.
5. California Environmental Protection Agency, Air Resources Board, *Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates*, May 3, 2002.
6. California Office of the Governor, *The California Strategic Growth Plan*, 2008.
7. California Climate Change Center, *Our Changing Climate: Assessing the Risks to California*, July 2006.

8. California Department of Transportation, *Climate Action Program at Caltrans*, December 2006.

9. California Department of Transportation, *Traffic Analysis, I-5 HOV Extension Project,* undated.

10. California Department of Transportation, *Draft California Statewide Procedures for Particulate Matter Hot Spot Analysis Consultation*, October 19, 2007.

11. California Division of Mines and Geology, *Geological Map of the Dana Point 7.5' Quadrangle, Orange County, California*, 1999.

12. California Division of Mines and Geology, *Geological Map of the San Clemente 7.5' Quadrangle, Orange County, California*, 1999.

13. California Natural Resources Agency, 2009 California Climate Adaptation Strategy, December 2, 2009.

14. The Climate Trust, *2007 RFP Conversion Metrics*, http://www.climatetrust.org, Accessed November 2009.

15. City of Dana Point, *City of Dana Point General Plan*, July 1991.

16. City of San Clemente, *City of San Clemente General Plan.* May 1993.

17. City of San Juan Capistrano, *City of San Juan Capistrano General Plan*, December 1999.

18. Federal Highway Administration, *Memorandum: Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents*, September 30, 2009.

19. Federal Highway Administration and United States Environmental Protection Agency, *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{10} and $PM_{2.5}$ Nonattainment and Maintenance Areas,* March 2006.

20. Federal Highway Administration, *Highway Statistics 2004*, March 2006.

21. Health Effects Institute, Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects, May 2009. http://pubs.healtheffects.org/view.php?id=306

22. Health Effects Institute, Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects, January 2007. http://pubs.healtheffects.org/view.php?id=282

23. Health Effects Institute, Summaries of Studies of Diesel Exhaust, November 2007. http://pubs.healtheffects.org/getfile.php?u=395

24. Institute of Transportation Studies-University of California Davis, *Transportation Project-Level Carbon Monoxide Protocol (UCD-ITS-RR-97-21)*, December 1997.

25. Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis, Summary for Policymakers*, February 2007.

26. Orange County Transit Authority and Caltrans, *Project Study Report*, February 2009.

27. South Coast Air Quality Management Agency, *2007 Air Quality Management Plan, South Coast Air Basin*, June 2007.

28. South Coast Air Quality Management District. *Rule 403: Fugitive Dust Control*, June 3, 2005. (http://aqmd.gov/rules/reg/reg04/r403.pdf)

29. Southern California Association of Governments, *2008 Regional Transportation Plan*: *Making the Connections*, Adopted May 8, 2008. (http://www.scag.ca.gov/rtp2008/)

30. Southern California Association of Governments, *2008 Regional Transportation Improvement Program*, Adopted 2008. (http://www.scag.ca.gov/rtip/)

31. The Thomas Guide, *2008 Los Angeles and Orange County Street Guide and Directory*, 2008.

32. U.S. Environmental Protection Agency, *Integrated Risk Information System (IRIS)*, January 2010. http://www.epa.gov/ncea/iris/index.html

33. U.S. Environmental Protection Agency, Risk Assessment Portal, Accessed January 2009. http://www.epa.gov/risk/basicinformation.htm#g

34. U.S. Environmental Protection Agency, *Technology Transfer Network Support Center for Regulatory Atmospheric Modeling*, May 2009. http://www.epa.gov/scram001/dispersion_alt.htm#hyroad

7.3 WEB SITES/PROGRAMS

California Air Resources Board, Aerometric Data Analysis and Management (ADAM) Air Quality Data www.arb.ca.gov.

California Department of Transportation, Standard Environmental Reference
http://www.dot.ca.gov/ser/index.htm

CT-EMFAC: A Computer Model to Estimate Transportation Project Emissions, December 10, 2007.
http://www.dot.ca.gov/hq/env/air/pages/ctemfac_license.htm

South Coast Air Quality Management District, www.aqmd.gov.

Southern California Association of Governments, *Regional Transportation Improvement Program (RTIP)*
http://www.scag.ca.gov/RTIP/index.htm

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APPENDIX

A. PM Interagency Consultation

PROGRAMS & PROJECTS
Compass Blueprint
Environment
Air Quality
Energy
Environmental Impact Reports
Environmental Justice
Intergovernmental Review
Solid & Hazardous Waste Management
Water
Housing
Local Profiles
Overall Work Program
Regional Comprehensive Plan
Regional Transportation Improvement Program
Regional Transportation Plan
SB 375 Regional Implementation Process
State of the Region
Strategic Plan
Transportation
REGIONAL COUNCIL
Districts & Representatives
Executive Officers
Governing Structure
LEGISLATION
State & Federal Programs
Find Your Representative
DATA SERVICES
Demographics, Trends & Statistics
Emergency Information Network
Goods Movement Database
Integrated Growth Forecast
Mapping & GIS
Modeling
MEDIA & COMMUNICATIONS
Press Room
Publications & Reports
SCAG TV - Streaming Videos

TCWG Project-Level PM Hot Spot Analysis Project Lists

Review of PM Hot Spot Interagency Review Forms

February 2010	Determination
ORA020109 ORA020109 Figures	Not a POAQC
* ORA2H01143 ORA2H01143 Exhibit 1a ORA2H01143 Exhibit 1b	Not a POAQC
RIV070710	Not a POAQC
RIV071259 RIV071259 Figure 1 RIV071259 Figure 2 RIV071259 Figure 3	Not a POAQC
RIV071262	Not a POAQC
RIV520109 RIV520109 Attachment 1 RIV520109 Attachment 2	The project sponsor will provide additional information on the truck traffic analysis in each intersection and how it would affect operations.

From: Rongsheng Luo <LUO@scag.ca.gov>
To: 'Eddie Torres' <EGTORRES@rbf.com>
CC: Achilles Malisos <AMALISOS@rbf.com>, Bo Burick <BURICK@rbf.com>, 'Mana' ...
Date: 4/9/2010 11:10 AM
Subject: I-5 HOV Extension POAQC Determination (ORA2H01143)

Hi Eddie,

As you may be aware, Project ORA2H01143 has been determined by TCWG to be not a project of air quality concern. The conformity determination for the project has been updated on the TCWG website (http://www.scag.ca.gov/tcwg/projectlist/february10.htm). If you have any questions, please let me know.

Rongsheng Luo

Program Manager
Transportation Modeling, Air Quality and Conformity Division
Department of Transportation Planning
Southern California Association of Governments
Telephone: (213) 236-1994
Fax: (213) 236-1963
Email: luo@scag.ca.gov

From: Mike Brady <mike_brady@dot.ca.gov>
To: Rongsheng Luo <LUO@scag.ca.gov>
CC: Achilles Malisos <AMALISOS@rbf.com>, Bo Burick <BURICK@rbf.com>, 'Eddie ...
Date: 3/29/2010 9:01 AM
Subject: Re: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

I'd recommend proceeding as Not a POAQC - differences Build/No Build are small to none, and as primarily an HOV lane project it doesn't add much in the way of diesel truck capacity. Aux. lanes and interchange modifications don't appear to be oriented to major truck traffic generators like distribution centers and industrial areas - primarily operational in nature for light-medium duty vehicles.

Michael Brady
California Department of Transportation
DOTP-ORIP
Air Quality/Conformity Coordinator
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Cell: (916) 804-2747

Rongsheng Luo <LUO@scag.ca.gov>
03/26/2010 02:19 PM

To
"OConnor.Karina@epamail.epa.gov" <OConnor.Karina@epamail.epa.gov>, 'Mike Brady' <mike_brady@dot.ca.gov>, "'Stew.Sonnenberg@dot.gov'" <Stew.Sonnenberg@dot.gov>
cc
'Eddie Torres' <EGTORRES@rbf.com>, Achilles Malisos <AMALISOS@rbf.com>, Bo Burick <BURICK@rbf.com>, 'Mana' <msangka@gmail.com>, Rongsheng Luo <LUO@scag.ca.gov>
Subject
FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

Hi Karina, Mike, and Stew,
As a follow-up to the TCWG meeting on February 23, 2010, the project sponsor has provided responses (see the email below and the attached files) to your comments and questions regarding project ORA2H01143. For your information, the approved February TCWG meeting minutes states that "the project sponsor will provide additional information on the truck traffic analysis in each intersection and how it would affect operations." Would you please review the sponsor's responses and let me know your comments and determination by the end of next week (4/2)? If you have any questions, please let me know. Thanks.
Rongsheng

Rongsheng Luo
Program Manager

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Don't miss the SCAG Regional Conference and General Assembly, May 5 – 7, 2010, at the La Quinta Resort & Club! Register now at www.scag.ca.gov.

From: Eddie Torres [mailto:EGTORRES@rbf.com]
Sent: Monday, March 22, 2010 2:26 PM
To: Rongsheng Luo
Cc: Achilles Malisos; Bo Burick
Subject: I-5 HOV Extension POAQC Determination (ORA2H01143)

Rongsheng -

I was checking on the status of our project which was submitted to the TCWG in February and noticed that a determination had not yet been made. Mike Brady indicated that Amy Kratovil with FHWA may have some additional questions or concerns. I was hoping you could forward this e-mail to her, as it has some additional information from our Air Quality Assessment (AQA). I have attached the following:

- Excerpt of the Particulate Matter, VMT/VHT, and modeling analyses from the AQA
- Outputs from the CT-EMFAC model
- TCWG submittal form (the same form that you reviewed at the meeting)

Although the mainline volumes are high, this segment of I-5 does not have a high percentage of truck traffic. It is 4 percent or less under existing conditions and will remain the same under build conditions. It should be noted that there are no ports, railyards, or other sources of heavy truck traffic in the study area.

In certain segments within the project area, this missing segment of the HOV lane has contributed to high accident rates due to the bottleneck. The other accessory improvements are meant to bring this segment under current safety standards and to reducing queuing at the current on- and off-ramps. Currently, traffic builds up on these existing access points and results in multiple failures. Our analysis has shown that there would be a negligible increase in VMT, a decrease in VHT, and an improvement at each of the study intersections/ramps. I hope that you can review this data and concur with our opinion that this project would improve air quality in the area and not be a POAQC.

If Amy has any questions or concerns, she can feel free to contact me directly. Thank you so much for your help.

==========

Eddie Torres, INCE, REA
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Phone (949) 855-3612
FAX (949) 837-4122

http://www.rbf.com
==========
[attachment "EMFAC Model Run.pdf" deleted by Mike Brady/HQ/Caltrans/CAGov] [attachment "I-5 HOV.pdf" deleted by Mike Brady/HQ/Caltrans/CAGov] [attachment "I-5 HOV - PM Interagency Consultation.pdf" deleted by Mike Brady/HQ/Caltrans/CAGov]

Achilles Malisos - RE: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

From: <OConnor.Karina@epamail.epa.gov>
To: <Stew.Sonnenberg@dot.gov>
Date: 4/9/2010 9:34 AM
Subject: RE: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)
CC: <LUO@scag.ca.gov>, <mike_brady@dot.ca.gov>, <AMALISOS@rbf.com>, <BURICK@rbf.com>, <EGTORRES@rbf.com>, <msangka@gmail.com>, <Emily.Biondi@dot.gov>

I also concur that the project is not a POAQC
-----<Stew.Sonnenberg@dot.gov> wrote: -----

To: <LUO@scag.ca.gov>
From: <Stew.Sonnenberg@dot.gov>
Date: 04/09/2010 08:44AM
cc: <mike_brady@dot.ca.gov>, <AMALISOS@rbf.com>, <BURICK@rbf.com>, <EGTORRES@rbf.com>, <msangka@gmail.com>, Karina OConnor/R9/USEPA/US@EPA, <Emily.Biondi@dot.gov>
Subject: RE: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

Hi Rongsheng, for reasons similar to Mike's, I also recommend that ORA2H01143 be Not a POAQC.

Thanks,

Stew Sonnenberg
Air Quality Specialist
Federal Highway Administration
916.498.5889
-----Original Message-----
From: Rongsheng Luo [mailto:LUO@scag.ca.gov]
Sent: Wednesday, April 07, 2010 5:44 PM
To: OConnor.Karina@epamail.epa.gov; Sonnenberg, Stew (FHWA)
Cc: 'Mike Brady'; Achilles Malisos; Bo Burick; 'Eddie Torres'; 'Mana'; Rongsheng Luo
Subject: RE: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)
Importance: High

Hi Karina and Stew,

Have you completed your review of the additional information provided by the project sponsor regarding project ORA2H01143 (see my email to you on 03/26/2010 02:19 PM)? If yes, would you please let me know your comments and/or determination as soon as possible? If not, would you please let me know when you will be able to complete your review because the project sponsor has asked about the status? For your information, Mike Brady recommended the project to be Not a POAQC (see his email below). If you have any questions, please let me know. Thanks.

Rongsheng

Rongsheng Luo
Program Manager
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-----Original Message-----
From: Mike Brady [mailto:mike_brady@dot.ca.gov]
Sent: Monday, March 29, 2010 9:01 AM
To: Rongsheng Luo
Cc: Achilles Malisos; Bo Burick; 'Eddie Torres'; Rongsheng Luo; 'Mana'; OConnor.Karina@epamail.epa.gov; 'Stew.Sonnenberg@dot.gov'
Subject: Re: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

I'd recommend proceeding as Not a POAQC - differences Build/No Build are small to none, and as primarily an HOV lane project it doesn't add much in
the way of diesel truck capacity. Aux. lanes and interchange modifications don't appear to be oriented to major truck traffic generators like distribution centers and industrial areas - primarily operational in nature for light-medium duty vehicles.

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California Department of Transportation
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Air Quality/Conformity Coordinator
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Cell: (916) 804-2747

Rongsheng Luo <LUO@scag.ca.gov>
03/26/2010 02:19 PM

To
"OConnor.Karina@epamail.epa.gov" <OConnor.Karina@epamail.epa.gov>, 'Mike Brady' <mike_brady@dot.ca.gov>, "'Stew.Sonnenberg@dot.gov'" <Stew.Sonnenberg@dot.gov>
cc
'Eddie Torres' <EGTORRES@rbf.com>, Achilles Malisos <AMALISOS@rbf.com>, Bo
Burick <BURICK@rbf.com>, 'Mana' <msangka@gmail.com>, Rongsheng Luo <LUO@scag.ca.gov>
Subject
FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

Hi Karina, Mike, and Stew,
As a follow-up to the TCWG meeting on February 23, 2010, the project sponsor has provided responses (see the email below and the attached files) to your comments and questions regarding project ORA2H01143. For your information, the approved February TCWG meeting minutes states that

"the project sponsor will provide additional information on the truck traffic analysis in each intersection and how it would affect operations."
Would you please review the sponsor's responses and let me know your comments and determination by the end of next week (4/2)? If you have any
questions, please let me know. Thanks.
Rongsheng

Rongsheng Luo
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From: Eddie Torres [mailto:EGTORRES@rbf.com]
Sent: Monday, March 22, 2010 2:26 PM
To: Rongsheng Luo
Cc: Achilles Malisos; Bo Burick
Subject: I-5 HOV Extension POAQC Determination (ORA2H01143)

Rongsheng -

I was checking on the status of our project which was submitted to the TCWG in February and noticed that a determination had not yet been made. Mike Brady indicated that Amy Kratovil with FHWA may have some additional

questions or concerns. I was hoping you could forward this e-mail to her,
as it has some additional information from our Air Quality Assessment (AQA). I have attached the following:

- Excerpt of the Particulate Matter, VMT/VHT, and modeling analyses from the AQA
- Outputs from the CT-EMFAC model
- TCWG submittal form (the same form that you reviewed at the meeting)

Although the mainline volumes are high, this segment of I-5 does not have

a high percentage of truck traffic. It is 4 percent or less under existing conditions and will remain the same under build conditions. It should be noted that there are no ports, railyards, or other sources of heavy truck traffic in the study area.

In certain segments within the project area, this missing segment of the HOV lane has contributed to high accident rates due to the bottleneck. The
other accessory improvements are meant to bring this segment under current
safety standards and to reducing queuing at the current on- and off-ramps.
Currently, traffic builds up on these existing access points and results

in multiple failures. Our analysis has shown that there would be a negligible increase in VMT, a decrease in VHT, and an improvement at each

of the study intersections/ramps. I hope that you can review this data and concur with our opinion that this project would improve air quality in
the area and not be a POAQC.

If Amy has any questions or concerns, she can feel free to contact me directly. Thank you so much for your help.

==========
Eddie Torres, INCE, REA
RBF Consulting
Phone (949) 855-3612
FAX (949) 837-4122
http://www.rbf.com
==========
[attachment "EMFAC Model Run.pdf" deleted by Mike Brady/HQ/Caltrans/CAGov] [attachment "I-5 HOV.pdf" deleted by Mike Brady/HQ/Caltrans/CAGov] [attachment "I-5 HOV - PM Interagency Consultation.pdf" deleted by Mike Brady/HQ/Caltrans/CAGov]

From: <Stew.Sonnenberg@dot.gov>
To: <LUO@scag.ca.gov>
CC: <mike_brady@dot.ca.gov>, <AMALISOS@rbf.com>, <BURICK@rbf.com>, <EGTORRES...
Date: 4/9/2010 8:45 AM
Subject: RE: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

Hi Rongsheng, for reasons similar to Mike's, I also recommend that ORA2H01143 be Not a POAQC.

Thanks,

Stew Sonnenberg
Air Quality Specialist
Federal Highway Administration
916.498.5889
-----Original Message-----
From: Rongsheng Luo [mailto:LUO@scag.ca.gov]
Sent: Wednesday, April 07, 2010 5:44 PM
To: OConnor.Karina@epamail.epa.gov; Sonnenberg, Stew (FHWA)
Cc: 'Mike Brady'; Achilles Malisos; Bo Burick; 'Eddie Torres'; 'Mana'; Rongsheng Luo
Subject: RE: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)
Importance: High

Hi Karina and Stew,

Have you completed your review of the additional information provided by the project sponsor regarding project ORA2H01143 (see my email to you on 03/26/2010 02:19 PM)? If yes, would you please let me know your comments and/or determination as soon as possible? If not, would you please let me know when you will be able to complete your review because the project sponsor has asked about the status? For your information, Mike Brady recommended the project to be Not a POAQC (see his email below). If you have any questions, please let me know. Thanks.

Rongsheng

Rongsheng Luo
Program Manager
Transportation Modeling, Air Quality and Conformity Division
Department of Transportation Planning
Southern California Association of Governments
Telephone: (213) 236-1994
Fax: (213) 236-1963
Email: luo@scag.ca.gov

-----Original Message-----
From: Mike Brady [mailto:mike_brady@dot.ca.gov]
Sent: Monday, March 29, 2010 9:01 AM
To: Rongsheng Luo
Cc: Achilles Malisos; Bo Burick; 'Eddie Torres'; Rongsheng Luo; 'Mana'; OConnor.Karina@epamail.epa.gov; 'Stew.Sonnenberg@dot.gov'
Subject: Re: FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

I'd recommend proceeding as Not a POAQC - differences Build/No Build are small to none, and as primarily an HOV lane project it doesn't add much in

the way of diesel truck capacity. Aux. lanes and interchange modifications don't appear to be oriented to major truck traffic generators like distribution centers and industrial areas - primarily operational in nature for light-medium duty vehicles.

Michael Brady
California Department of Transportation
DOTP-ORIP
Air Quality/Conformity Coordinator
Phone: (916) 653-0158
Fax: (916) 653-1447
Cell: (916) 804-2747

Rongsheng Luo <LUO@scag.ca.gov>
03/26/2010 02:19 PM

To
"OConnor.Karina@epamail.epa.gov" <OConnor.Karina@epamail.epa.gov>, 'Mike Brady' <mike_brady@dot.ca.gov>, '"Stew.Sonnenberg@dot.gov"' <Stew.Sonnenberg@dot.gov>
cc
'Eddie Torres' <EGTORRES@rbf.com>, Achilles Malisos <AMALISOS@rbf.com>, Bo Burick <BURICK@rbf.com>, 'Mana' <msangka@gmail.com>, Rongsheng Luo <LUO@scag.ca.gov>
Subject
FW: I-5 HOV Extension POAQC Determination (ORA2H01143)

Hi Karina, Mike, and Stew,
As a follow-up to the TCWG meeting on February 23, 2010, the project sponsor has provided responses (see the email below and the attached files) to your comments and questions regarding project ORA2H01143. For your information, the approved February TCWG meeting minutes states that "the project sponsor will provide additional information on the truck traffic analysis in each intersection and how it would affect operations." Would you please review the sponsor's responses and let me know your comments and determination by the end of next week (4/2)? If you have any questions, please let me know. Thanks.
Rongsheng

Rongsheng Luo
Program Manager
Transportation Modeling, Air Quality and Conformity Division
Department of Transportation Planning
Southern California Association of Governments
Telephone: (213) 236-1994
Fax: (213) 236-1963
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Rongsheng -

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- Excerpt of the Particulate Matter, VMT/VHT, and modeling analyses from the AQA
- Outputs from the CT-EMFAC model
- TCWG submittal form (the same form that you reviewed at the meeting)

Although the mainline volumes are high, this segment of I-5 does not have a high percentage of truck traffic. It is 4 percent or less under existing conditions and will remain the same under build conditions. It should be noted that there are no ports, railyards, or other sources of heavy truck traffic in the study area.

In certain segments within the project area, this missing segment of the HOV lane has contributed to high accident rates due to the bottleneck. The other accessory improvements are meant to bring this segment under current safety standards and to reducing queuing at the current on- and off-ramps. Currently, traffic builds up on these existing access points and results in multiple failures. Our analysis has shown that there would be a negligible increase in VMT, a decrease in VHT, and an improvement at each of the study intersections/ramps. I hope that you can review this data and concur with our opinion that this project would improve air quality in the area and not be a POAQC.

If Amy has any questions or concerns, she can feel free to contact me directly. Thank you so much for your help.

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Eddie Torres, INCE, REA
RBF Consulting
Phone (949) 855-3612
FAX (949) 837-4122
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RTIP ID# *(required)*: 2H01143

TCWG Consideration Date: February 23, 2010

Project Description *(clearly describe project)*

The Orange County Transportation Authority (OCTA), in cooperation with the California Department of Transportation (Caltrans), the cities of San Clemente, Dana Point, and San Juan Capistrano, is proposing to widen Interstate 5 (I-5) between Avenida Pico and San Juan Creek Road; refer to Exhibits 1a and 1b (Site Plan). The project objectives are to provide continuity of the I-5 mainline high-occupancy vehicle (HOV) network within the project limits; maximize overall performance within the project limits by minimizing weaving conflicts at the termini of the HOV lanes; maintaining travel speeds for HOV lane users; provide intermittent auxiliary lanes, where needed, to relieve congestion at diverge and merge locations; minimize right-of-way acquisition; relieve congestion within interchange areas, on- and off-ramps, and local intersections; and reduce congestion on I-5 within the project limits. The project limits on I-5 extend from 0.4 mile south of the Avenida Pico Undercrossing (UC) (PM 3.0) to 0.1 mile south of the San Juan Creek Road UC (PM 8.7). The proposed project would add one HOV lane in each direction on I-5 throughout the project limits, reestablish existing auxiliary lanes and construct new auxiliary lanes, and improve several existing on- and off-ramps.

Four alternatives, including the No Build Alternative, will be analyzed as part of the Draft Initial Study/Environmental Assessment (IS/EA). The project alternatives are described below.

Alternative 1 (No Build)

The no-build alternative proposes no improvements to I-5, maintaining the existing four general purpose lanes throughout the project limits in the northbound and southbound directions. All freeway facilities would remain as-is with the exception of proposed projects that are under development or currently in construction.

Alternative 2

Auxiliary Lanes. Alternative 2 proposes to remove the existing I-5 paved shoulders and construct a new travel way and new shoulder pavement to the outside of the northbound and southbound lanes to accommodate HOV lanes. This alternative proposes full standard widths, including a 10-foot inside shoulder, 12-foot HOV lane, four-foot buffer, four 12-foot general purpose lanes, and a 10-foot outside shoulder throughout the majority of the project limits. Additionally, existing auxiliary lanes through the project limits are proposed to be reestablished, and new auxiliary lanes would be constructed at the following locations:

- To Avenida Vista Hermosa southbound off-ramp;
- From Avenida Vista Hermosa northbound on-ramp; and
- From Camino de Estrella southbound on-ramp.

Avenida Pico Interchange Improvements. In addition to providing an HOV lane through the I-5/Avenida Pico interchange, the interchange configuration would also be improved. There are two options under consideration for reconfiguration of the interchange, both of which require replacement of the Avenida Pico Overcrossing structure.

- Design Option A – Modified Tight Diamond Interchange. Under this option, the on- and off-ramps at Avenida Pico would be realigned and the northbound on-ramp would be widened to three lanes. The overall configuration of the interchange would be similar to the existing configuration. Additionally, Avenida Pico would be improved under the structure to provide dual left-turn lanes to both the northbound and southbound on-ramps. This alternative would incorporate an interconnect line to optimize signal timing and operations for the closely spaced intersections at the interchange. The geometry of Avenida Pico would also be improved on the east side of I-5 to remove the existing reversing curves. Bicycle lanes and standard outside shoulders would be provided throughout the majority of the interchange in both the eastbound and westbound directions. A sidewalk would be provided through the interchange in the eastbound direction. In the westbound direction, space would be provided to accommodate future construction of a sidewalk through the interchange.

- Design Option B – Northbound Loop On-Ramp/Realigned Northbound Off-Ramp. Under this option, a northbound loop on-ramp would be added to allow for the removal of the existing left-turn lane for traffic heading eastbound on Avenida Pico to access northbound I-5. (The existing directional on-ramp would remain in place for traffic heading westbound to access northbound I-5.) Additionally, the northbound off-ramp would be reconfigured around the loop resulting in a partial cloverleaf configuration. The southbound ramps would be realigned and the geometry of Avenida Pico would be improved as proposed in Design Option A. Dual left-turn lanes would be provided under the structure to the southbound on-ramp. Bicycle lanes and standard outside shoulders would be provided throughout the majority of the interchange in both the eastbound and westbound directions. A sidewalk would be provided through the interchange in the eastbound direction. In the westbound direction, space would be provided to accommodate future construction of a sidewalk through the interchange.

Ramps. All ramps within the project limits would be modified in order to accommodate the HOV lanes, which include improvements ranging from restriping to complete reconstruction. Specifically, ramp modifications under this alternative include:

Avenida Pico

- Modify ramps as described in Design Options A and B above.

Avenida Vista Hermosa

- Restripe the northbound and southbound loop on-ramps; and
- Restripe the northbound on- and off-ramps and southbound off-ramp.

Camino de Estrella

- Realign, reconstruct, and widen the southbound off-ramp to a two-lane ramp;
- Realign and reconstruct the northbound and southbound on-ramps and northbound loop on-ramp; and
- Realign the northbound off-ramp.

Camino Las Ramblas/Pacific Coast Highway (PCH)

- Realign, reconstruct, and widen the southbound on-ramp to a two-lane ramp;
- Realign and reconstruct the southbound loop on-ramp;
- Realign the southbound off-ramp and northbound on- and off-ramps; and
- Realign the northbound I-5 connector.

Camino Capistrano (Stonehill Drive)

- Realign and reconstruct the northbound on-ramp with a lower profile under the bridge to provide a standard vertical clearance.

Structures

Via California

- Reduced shoulder widths are proposed under the Via California structure in order to avoid replacement of the existing Via California Overcrossing (Bridge No. 55-225). The inside shoulder would be reduced to approximately four feet at the minimum location and the HOV buffer would be eliminated in the northbound direction.

Avenida Pico

- This alternative also proposes to replace the Avenida Pico UC structure (Bridge No. 55-205) to accommodate the HOV lane in each direction through the interchange. In order to achieve minimum vertical clearance for this structure, the I-5 mainline profile would be raised through the interchange area. Additionally, to ensure that all existing mainline lanes are open through construction, the I-5 centerline would be realigned westerly approximately 20 feet through the interchange.

Avenida Vaquero UC (Bridge No. 55-223)

- Structure widening.

Northbound I-5 to northbound PCH Connector (Bridge No. 55-226)

- Structure widening.

Route 5/Camino Las Ramblas UC (Bridge No. 55-510)

- Structure widening.

Camino Capistrano UC (Stonehill Drive) (Bridge No. 55-227L and 55-227R)

- Structure widening.

Other Improvements. Alternative 2 proposes to improve the existing compound curve between 0.3 mile south of Stonehill Drive and Pacific Coast Highway (PCH). This alternative would provide a wide inside shoulder (26 feet at the maximum width) throughout the southern portion of the curve along with increasing the radius from 2,000 to 2,200 feet to accommodate full standard stopping sight distance in the southbound direction. For the northern portion of the curve, the existing radius would be increased from 3,200 to 3,300 feet, with a 16-foot shoulder, in order to achieve a standard stopping sight distance through this portion of the compound curve. To accommodate the improvements to this compound curve, the median would be reconstructed.

Alternative 3

Alternative 3 is very similar in nature to Alternative 2. The differences are noted below:

Auxiliary Lanes. New auxiliary lanes would be constructed at the same locations as noted in Alternative 2.

Avenida Pico Interchange Improvements. Design options for the Avenida Pico interchange reconfiguration would be the same as those noted under Alternative 2.

Ramps. Ramp modifications would be the same as those noted under Alternative 2 with the exception of the following:

Camino Capistrano (Stonehill Drive)

- Realign and reconstruct the northbound on-ramp with a lower profile under the bridge to provide standard vertical clearance.

Structures. Modifications and improvements to structures are the same as those noted under Alternative 2 with the exception that I-5 northbound Camino Capistrano UC (Stonehill Drive) (Bridge No. 55-227R) would not be widened.

Other Improvements. Unlike Alternative 2, in Alternative 3, for the northern portion of the compound curve, the existing radius would not be changed and a two-foot median shoulder would be provided, resulting in a non-standard stopping sight distance. To accommodate the improvements to this compound curve, the median would be reconstructed.

Alternative 4

Alternative 4 includes many of the improvements common to Alternatives 2 and 3, with a few modifications. Alternative 4 proposes no buffer instead of the four-foot buffer proposed in Alternatives 2 and 3. Under the no buffer scenario, the HOV lane would either accommodate limited access, with ingress/egress points for the interchanges, or continuous access throughout the project limits.

Auxiliary Lanes. New auxiliary lanes would be constructed at the same locations as noted in Alternatives 2 and 3.

Avenida Pico Interchange Improvements. Design options for the Avenida Pico interchange reconfiguration would be the same as those noted under Alternative 2.

Ramps. Ramp modifications would be the same as those noted under Alternative 3.

Structures. Modifications and improvements to structures are the same as those noted under Alternatives 2 and 3.

Other Improvements. Unlike Alternatives 2 and 3, for the northern portion of the compound curve, the existing radius would not be changed and a standard 10-foot median shoulder would be provided, which would minimize impacts but results in a non-standard stopping sight distance condition. To accommodate the improvements to this compound curve, the median would be reconstructed.

Type of Project *(use Table 1 on instruction sheet)*
Change to existing state highway.

County: Orange	**Narrative Location/Route & Postmiles:** Interstate 5, PM 3.0/8.7 **Caltrans Projects – EA#** 0F9600

Lead Agency: California Department of Transportation

Contact Person	**Phone#**	**Fax#**	**Email**
Reza Aurasteh, Ph.D., Chief	949.724.2738	949-724-2591	reza_aurasteh@dot.ca.gov

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:

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

Exempt	**Section 6004 –Categorical Exemption**		**Section 6005 – Non-Categorical Exemption**
		X	

Current Programming Dates *(as appropriate)*

	PE/Environmental	**ENG**	**ROW**	**CON**
Start	2009	2011	2012	2015
End	2011	2014	2014	2019

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

Purpose

The purpose of the project is to improve existing and future traffic operations on I-5 from San Juan Creek Road to Avenida Pico while minimizing environmental and economic impacts. The following key issues represent general deficiencies of I-5 within the project limits, and the potential solutions/opportunities for improvements:

- Achieve higher person carrying capacity within the corridor by increasing the vehicle occupancy rate;
- Reduce pollution and improve air quality along this corridor;
- Promote ride sharing and the use of HOVs such as carpools, vanpools, and bus services;
- Provide another lane option allowing for more consistent and predictable travel times for carpools, vanpools, buses, transit services, and emergency vehicles during peak periods;
- Relieve congestion due to the merge and diverge points for successive on- and off-ramps in both directions;
- Reduce delay due to the existing HOV termini location;
- Improve the capacity of the on- and off-ramps within the project limits, where needed; and
- Relieve congestion between successive ramps at several interchanges.

The project objectives include the following:

- Provide continuity of the I-5 mainline HOV network within the project limits;
- Maximize overall performance within the project limits by minimizing weaving conflicts at the termini of the HOV lanes and maintaining travel speeds for HOV lane users;
- Provide intermittent auxiliary lanes, where needed, to relieve congestion at diverge and merge locations;
- Minimize right-of-way acquisition;
- Relieve local street congestion within interchange areas, on- and off-ramps, and local intersections; and
- Reduce congestion on I-5 within the project limits.
- Congestion due to weaving and merging between the successive ramps at several interchanges.

Need

Without this project, the efficiency of the regional HOV system would be reduced because HOV traffic would be required to merge into mixed-flow traffic lanes. Delay in completion of this project would contribute to traffic congestion on I-5 within the cities of San Clemente, Dana Point, and San Juan Capistrano. The proposed project is needed to address:

- A high level of traffic during the weekdays as well as the weekends/holidays through this section;
- Congestion due to the termination of the existing HOV lane in both directions;
- Delay due to weaving and merging of HOV at the current termini in both directions;
- Congestion at the on/off ramps due to high traffic demands at the ramps; and
- Congestion due to weaving and merging between the successive ramps at several interchanges.

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

The proposed project site is within the cities of San Clemente, Dana Point, and San Juan Capistrano. Within the City of San Juan Capistrano, the project site is immediately surrounded by commercial uses. However, within the City of Dana Point and the City of San Clemente, the project site is surrounded by mostly residential uses. Five local arterial interchanges are within the project limits: Avenida Pico; Avenida Vista Hermosa; Camino de Estrella; Camino Las Ramblas/Pacific Coast Highway (PCH); and Camino Capistrano/San Juan Creek Road. Additionally, diesel truck traffic currently makes up four percent of the total traffic volumes within the project limits. The proposed project would extend HOV lanes and would not significantly change the number of trucks or the characteristics of trucks in the project area.

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

The project would involve removal of the existing I-5 paved shoulders and constructing a new travel way and new shoulder pavement to the outside of the northbound and southbound lanes to accommodate HOV lanes. Project construction would commence in 2015 and would be completed in 2019. The traffic analysis utilized existing 2009 traffic data and horizon year (2040) traffic data. As a result, existing conditions traffic data and operations have been presented in lieu of "Opening Year Conditions" traffic data. Table 1 (Existing Traffic Volumes), depicts the existing traffic volumes along each segment within the project limits. As shown in Table 1, existing traffic volumes range from 184,000 to 241,200 average daily trips (ADT), which includes truck volumes that range from 7,388 to 9,648 ADT.

Table 1
Existing Traffic Volumes

Location	Existing Conditions (2009)		
	ADT	% Trucks	# Trucks
I-5 Mainline			
South of Avenida Pico	184,700	4	7,388
South of Vista Hermosa	192,600	4	7,704
South of Camino de Los Mares	209,800	4	8,392
South of PCH/Camino Las Ramblas	228,500	4	9,140
South of Camino Capistrano/Stonehill	221,400	4	8,856
South of San Juan Creek	241,200	4	9,648
ADT = Average Daily Traffic; PCH = Pacific Coast Highway			
Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Data*, December 2009.			

The Caltrans performance standard for Freeway Mix-Flow (General Purpose) Lanes is a vehicle to capacity ratio (V/C) of less than or equal to 1.00. For freeway HOV Lanes, the standard is less than or equal to 1,600 vehicles per hour (vph) (1 lane), or 1,750 vph (2 lanes). Table 2 (Existing Conditions Level of Service) summarizes the existing V/C and corresponding Level of Service (LOS) along I-5 within the project area. As shown in Table 2, freeway segments along the I-5 mainline currently operate at an acceptable LOS.

Table 2
Existing Conditions Level of Service

Location	Existing	
	AM Peak Hour	PM Peak Hour
	V/C - LOS	V/C - LOS
I-5 Mainline - Northbound		
South of Avenida Pico	0.70 – C	0.69 – C
South of Vista Hermosa	0.74 – C	0.75 – D
South of Camino de Los Mares	0.83 – D	0.81 – D
South of PCH/Camino Las Ramblas	0.92 – E	0.88 – D
South of Camino Capistrano/Stonehill	0.75 – D	0.66 – C
South of San Juan Creek	0.92 – E	0.78 – D
I-5 Mainline - Southbound		
South of Avenida Pico	0.51 – B	0.62 – C
South of Vista Hermosa	0.69 – C	0.80 – D
South of Camino de Estrella	0.74 – C	0.89 – D
South of PCH/Camino Las Ramblas	0.73 – C	0.89 – D
South of Camino Capistrano/Stonehill	0.59 – B	0.81 – D
South of San Juan Creek	0.59 – B	0.81 – D
V/C = vehicle to capacity ratio; LOS = Level of Service; PCH = Pacific Coast Highway		
Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Data*, December 2009.		

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

Table 3 (Future Year 2040 Traffic Volumes) compares the horizon year "2040 No Build" and "2040 Build" traffic volumes along each freeway segment. As shown in Table 3, traffic volumes within the project limits exceed 125,000 vehicles daily. However, the percentage of trucks along this corridor is four percent, which is below the national average of eight percent[1]. Based on the Caltrans document entitled *California Statewide PM Hot Spot Procedures* (dated October 19, 2007), a "significant increase" of diesel vehicles (trucks) is 5 percent when comparing Build with No Build alternatives. As depicted in Table 3, the greatest increase in truck volumes would be 3.25 percent. The average increase among all segments within the project limits would be 1.22 percent. The proposed continuation of HOV lanes would not affect truck travel along in the project area. As a result, the proposed project would not result in a significant increase of diesel vehicles. The increase in truck volumes between No Build and Build conditions can be attributed to the increase in overall traffic volumes. As total ADTs increase, the volume of trucks would increase proportionally.

Table 3
Future Year 2040 Traffic Volumes

Location	2040 No Build			2040 Build			# Trucks Percent Change
	ADT	% Trucks	# Trucks	ADT	% Trucks	# Trucks	
I-5 Mainline							
South of Avenida Pico	246,000	4	9,840	254,000	4	10,160	3.25%
South of Vista Hermosa	256,000	4	10,240	260,000	4	10,400	1.56%
South of Camino de Los Mares	267,000	4	10,680	270,000	4	10,800	1.12%
South of PCH/Camino Las Ramblas	293,000	4	11,720	296,000	4	11,840	1.02%
South of Camino Capistrano/Stonehill	279,000	4	11,160	280,000	4	11,200	0.36%
South of San Juan Creek	300,000	4	12,000	300,000	4	12,000	0.00%
ADT = Average Daily Traffic; PCH = Pacific Coast Highway							

[1] Federal Highway Administration, *Highway Statistics 2004*, March 2006.

Additionally, Table 4 (Horizon Year Level of Service) summarizes the existing and forecast future year 2040 peak hour volume to capacity analysis for the project limits on I-5. As shown in Table 4, implementation of the proposed project would alleviate several peak hour mainline deficiencies thereby reducing congestion.

Table 4
Horizon Year Level of Service

Location	2040 No Build		2040 Build	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	V/C - LOS	V/C - LOS	V/C - LOS	V/C - LOS
I-5 Mainline - Northbound				
South of Avenida Pico	0.92 – E	0.84 – D	0.93 – E	0.85 – D
South of Vista Hermosa	0.97 – E	0.92 – E	0.87 – D	0.84 – D
South of Camino de Los Mares	1.11 – F	1.00 – E	0.99 – E	0.92 – E
South of PCH/Camino Las Ramblas	1.27 – F	1.04 – F	1.15 – F	0.95 – E
South of Camino Capistrano/Stonehill	1.07 – F	0.82 – D	1.06 – F	0.82 – D
South of San Juan Creek	1.24 – F	1.01 – F	1.23 – F	1.01 – F
I-5 Mainline - Southbound				
South of Avenida Pico	0.70 – C	0.84 – D	0.70 – C	0.84 – D
South of Vista Hermosa	0.93 – E	1.06 – F	0.85 – D	0.91 – E
South of Camino de Estrella	1.02 – F	1.21 – F	0.87 – D	0.99 – E
South of PCH/Camino Las Ramblas	0.99 – E	1.16 – F	0.87 – D	1.01 – F
South of Camino Capistrano/Stonehill	0.79 – D	1.00 – F	0.83 – D	1.08 – F
South of San Juan Creek	0.79 – D	1.00 – F	0.83 – D	1.08 – F
V/C = vehicle to capacity ratio; LOS = Level of Service; PCH = Pacific Coast Highway				
Source: Austin-Foust Associates, Inc., *I-5 HOV Lane Extension PA/ED Data*, December 2009.				

Opening Year: If facility is an interchange(s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT
See Above.

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
See Above.

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

The Regional Traffic Model produced by SCAG predicts ADT volumes based upon socio-economic data received from all of the counties and cities within their jurisdiction. The traffic volumes and peak hour demand are derived from the number of households, population, and number of jobs in the region. The ADT is derived by iterative model runs designed to determine the shortest route for travelers in time and distance. The proposed HOV lane extension would provide continuity of the I-5 mainline HOV network and maximize overall performance within the project limits. Extending the HOV lane would maintain travel speeds and minimize weaving conflicts that occur at the termini of the HOV lanes. The HOV Extension project would not divert to other routes, and the travel demand volume is not predicted to vary significantly between the build and no-build conditions.

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

The EPA's March 2006 guidance document *Transportation Guidance for Qualitative Hot-spot Analysis in PM2.5 and PM10 Nonattainment and Maintenance Areas* references a two step criteria to identify "a significant volume of diesel truck traffic." The first criterion is facilities with greater than 125,000 ADT volumes. If the first criterion is met, the second criterion is that 8 percent or more of said traffic volumes (i.e., 10,000 vehicles or more) are diesel truck traffic volumes.

As discussed above, traffic volumes within the project limits exceed 125,000 vehicles daily. However, the percentage of trucks along this corridor is four percent, which is below the national average of eight percent. A "significant increase" of diesel vehicles (trucks) is considered to be 5 percent when comparing Build with No Build alternatives. The average increase among all segments within the project limits would be 1.22 percent. As a result, the proposed project would not result in a significant increase of diesel vehicles. As such, the project would not to result in a substantial increase in the number of diesel vehicles within the project area (i.e., the project limits of I-5). According to the *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*, this project is not a project of air quality concern under 40 CFR 93.123(b)(1).

The proposed project would not conflict with an applicable plan, policy, or regulation of an agency with jurisdiction over the project. The proposed project is also consistent with Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP) (RTP ID 2H01143) and Regional Transportation Improvement Program (RTIP) (RTIP ID ORA080912) and is intended to meet the traffic needs in the area based on local land use plans.

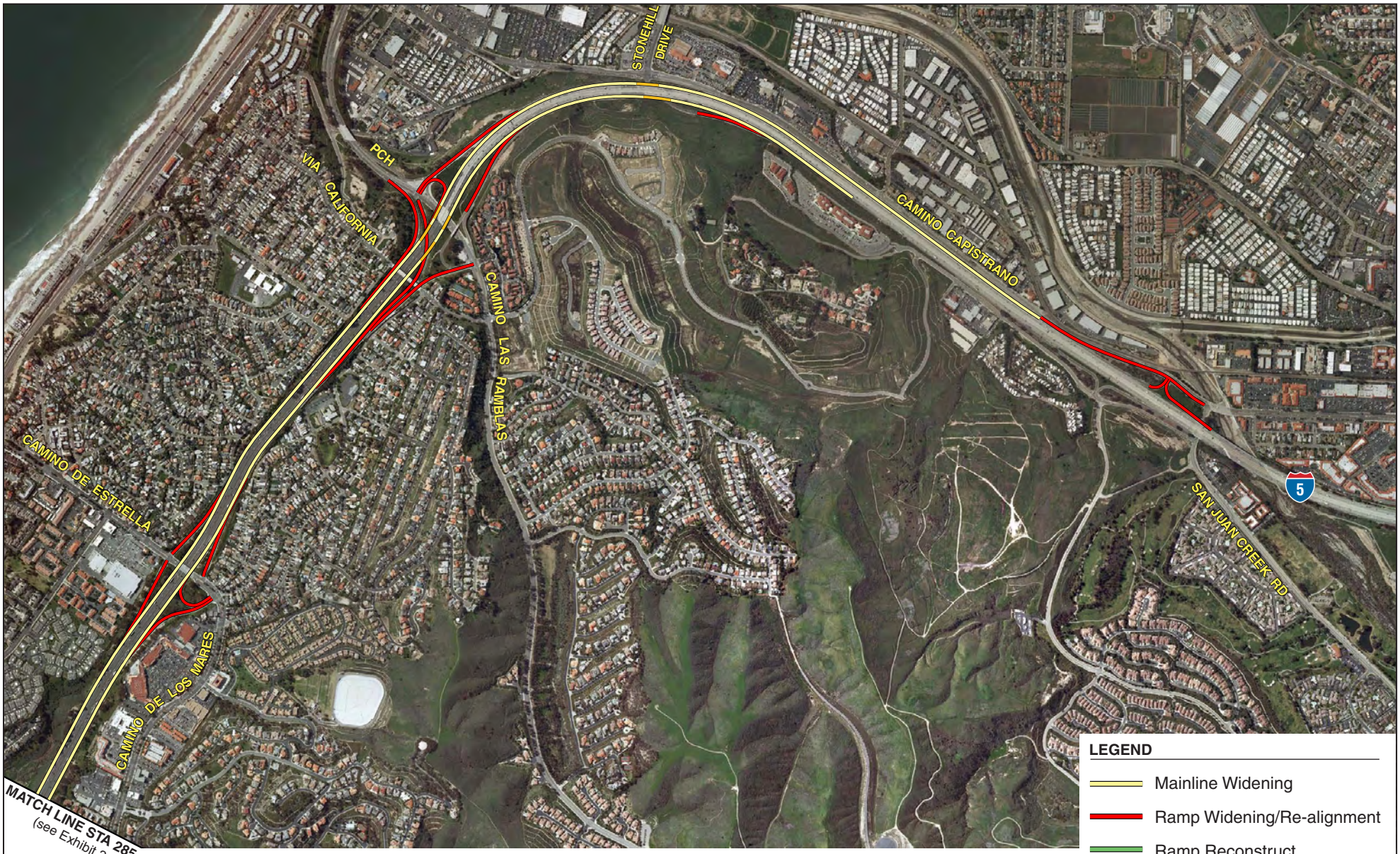
I-5 HOV LANE EXTENSION PROJECT • RTIP ID# 2H01143
TRANSPORTATION CONFORMITY WORKING GROUP SUBMITTAL

not to scale

Site Plan

1/18/10 JN 10-106626-16417 MAS

Exhibit 1a



not to scale

I-5 HOV LANE EXTENSION PROJECT • RTIP ID# 2H01143
TRANSPORTATION CONFORMITY WORKING GROUP SUBMITTAL

Site Plan

2/3/10 JN 10-106626-16417 MAS

Exhibit 1b

B. Conformity Sheets

CO	SYS*	LEAD AGENCY	RTP ID	RTIP ID	RTE	BEG PM	END PM	STREET	FROM	TO	DESCRIPTION	ADDITIONAL DETAILS, IF AVAILABLE	2008 RTIP	NO BUILD	NETWORK YR (PROJECT COMPLETION							
															2008	2009	2010	2012	2014	2020	2030	2035
LA	T	SAN FERNANDO	LAE0127	LAE0127	0	0.0	0.0	BUS PURCHASE			PROCUREMENT OF (3) CNG TRANSIT VEHICLES AND RELATED INFRASTRCTURE EQUIPMENT FOR FIXED ROUTE PUBLIC TRANSPORTATION.	"The City of San Fernando proposes a fixed route system operating on two separate routes. The North Loop is approximately seven miles in length while the South Loop approximately five miles in length. We intend to run our trolleys six days a week, Monday through Saturday, 10 hours per day, with three turns (loops) completed each hour. The trolley's CNG consumption rate is estimated to be 3.5 miles per gallon and 16,000 gallons per trolley year each. The basic arithmetic supporting fuel consumption is as follows: 12 miles/loop x 3 loops/hour x 10 hours/day = 360 miles/day; 36 miles/day x 6 days/week x 52 weeks/year = 112,000 miles/year; 112,000 miles/year ÷ 3.5 miles/gallon ÷ 2 trolleys = 16,000 gallons/year each trolley	√	√				√				
LA	T	SANTA CLARITA	LA0C8371	LA0C8371	0	0.0	0.0	BUS PURCHASE			SANTA CLARITA TRANSIT EXPANSION BUSES; WILL ALLOW PHASE 1 OF 5 YEAR MASTER PLAN TO BE IMPLEMENTED WITH NINE LOCAL BUSES AND TWO COMMUTER BUSES.		√	√	√							
LA	T	SANTA CLARITA	LA0D363	LA0D363	0	0.0	0.0	BUS PURCHASE			SANTA CLARITA TRANSIT PHASE 2 - EXPANSION BUSES - 2 OVER THE ROAD COMMUTER BUSES.		√	√				√				
LA	T	SANTA CLARITA	LAF1424	LAF1424	0	0.0	0.0				McBean Regional Transit Center Park and Ride. Purchase land, design, and construct a regional park-and-ride lot adjacent to the McBean Regional Transit Center in the City of Santa Clarita	Add 300 parking spaces Location: McBean Regional Transit Center Park and Ride, Santa Clarita	√					√				
LA	T	SANTA FE SPRINGS	1TR1008		0	0.0	0.0	NORWALK/SANTA FE SPRINGS TRANSPORTATION CTR PARKING			NORWALK/SANTA FE SPRINGS TRANSPORTATION CTR PHASE II PARKING. CONSTRUCT A TOTAL OF APPROX. 150 PARKING SPACES ON A SITE ADJACENT TO THE METROLINK STATION.									√		
LA	T	SANTA MONICA MUNICIPAL BUS	LAE0364	LAE0364	0	0.0	0.0	SOUTH BUNDY DRIVE	NEAR AIRPORT AVENUE		CONSTRUCT INTERMODAL PARK AND RIDE FACILITY AT SANTA MONICA COLLEGE CAMPUS ON SOUTH BUNDY DRIVE NEAR AIRPORT AVENUE		√				√					
LA	T	SCRRA / LACMTA / SANBAG	LA0C8232	LA0C8232	0	0.0	0.0	METROLINK COMMUTER RAIL			ANTELOPE VALLEY LINE CHANGES AT SANTA CLARITA-ALIGNMENT CHANGES WILL PERMIT HIGHER SPEEDS OF OPERATION AND REDUCE MAINTENANCE COST- (SCRRA). (PPNO 3202).		√	√						√		
LA & SB	T	TBD	HSRT0703 & HSRT0704		0	0.0	0.0	EXTENDED IOS	LAX	SAN BERNARDINO	HIGH SPEED REGIONAL TRANSPORT: EXTENDED IOS FROM LAX TO SAN BERNARDINO	STATIONS AT LAX, WEST LA, UNION STATION, WEST COVINA IN LA COUNTY, ONTARIO AND SAN BERNARDINO IN SAN BERNARDINO COUNTY								√		
LA	T	TORRANCE	LA000666	LA000666	0	0.0	0.0	BLUE LINE FEEDER SERVICE			LINE #6 - BLUE LINE FEEDER SERVICE	THE FOLLOWING TRIPS ARE BEING ADDED - 8:30AM, 10:30AM, 11:30AM, AND 1:00PM. THERE WILL BE 84 NEW SERVICE REVENUE MILES AND 5.14 REVENUE SERVICE HOURS WITH 90 MINUTE HEADWAYS.	√	√		√						
OR	S	ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA020111	ORA020111	5	3.4	3.6	I-5	AVENIDA PICO	VISTA HERMOSA	I-5 AT AVENIDA PICO SOUTHBOUND OFF RAMP WIDENING FROM 1 TO 2 LANES AND EXTEND THE EXISTING AUX LANE TO CONNECT WITH S/B AUX LANE AT VISTA HERMOSA ON RAMP.	WIDEN SOUTHBOUND OFF RAMP FROM 1 TO 2 LANES. EXTEND EXISTING AUXILIARY LANE TO CONNECT WITH THE SOUTHBOUND AUXILIARY LANE AT VISTA HERMOSA ON RAMP.	√	√	√							
OR	S	ORANGE COUNTY TRANS AUTHORITY (OCTA)	2M0714		5	3.4	0.0	I-5	AVENIDA PICO		WIDEN ON/OFF RAMPS TO 2 LANES										√	
OR	S	CALTRANS	2H01143	ORA080912	5	3.4	6.8	I-5	Coast Highway	Avenida Pico	ADD 1 HOV LANE EACH DIRECTION	Existing Configuration: No HOV Lanes								√		
OR	S	SAN CLEMENTE	10287	10287	5	4.1	0.0	AVENIDA VISTA HERMOSA	AT ROUTE 5 INTERCHANGE		AVENIDA VISTA HERMOSA @ I-5 NEW INTERCHANGE FROM 0 TO 5 LANES ON OVERPASS (2 LANES WEST & 3 LANES EAST)..	FROM 1 TO 5 LANES ON OVERPASS (2 WB & 3 EB)	√	√	√							
OR	S	CALTRANS	ORA030602	ORA030602	5	5.8	0.0	I-5	Camino de Estrella		IN SAN CLEMENTE - SB CAMINO DE ESTRELLA - WIDEN OFF-RAMP FROM 1 TO 2 LANES AND WIDEN OVERCROSSING FROM 5 TO 7 LANES (1 WB LEFT TURN LANE AND 1 EB LANE)		√					√				
OR	S	CALTRANS	2M04109A		5	7.3	0.0	I-5	Stonehill Dr		ADD SOUTHBOUND I-5 OFF-RAMP AT STONEHILL	Existing Config: No SB off-ramp								√		
OR	S	ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA020109	ORA020109	5	8.4	8.7	I-5	AT CAMINO CAPISTRANO INTERSECTION		I-5 AT CAMINO CAPISTRANO INTERSECTION IMPROVEMENT. WIDEN S/B OFFRAMP FROM 2 TO 3 LANES.	WIDEN SOUTHBOUND OFFRAMP FROM 2 TO 3 LANES	√	√				√				
OR	S	ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA120326	ORA120326	5	9.6	0.0	I-5	SR-74		NB/SB AT I-5/SR-74 SEPARATION, REBUILD INTERCHANGE INCLUDING WIDENING OF SR-74 OVERCROSSING		√	√					√			
OR	S	CALTRANS	2M0730		5	12.6	18.7	I-5	AVERY PKWY	ALICIA PKWY	ADD 1 MF LANE EACH DIRECTION	Existing Config: 4 to 5 lanes each direction										√
OR	S	CALTRANS	2M01111		5	12.9	0.0	I-5	Avery Parkway		AVERY PARKWAY RAMP RELOCATION, RECONFIGURATION, UPGRADES	Existing Config: 1 to 2 lane on- and off-ramps									√	
OR	S	CALTRANS	ORA030604	ORA030604	5	13.7	15.0	I-5	Crown Valley		IN THE CITY OF MISSION VIEJO SB OFFRAMP AT CROWN VALLEY PARKWAY - WIDEN OFFRAMP FROM 4 TO 5 LANES		√					√				
OR	S	ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA020112	ORA020112	5	15.1	16.3	I-5	AT OSO PARKWAY EXIT LANE AND NORTHBOUND ON RAMP		I-5 SOUTHBOUND AT OSO PARKWAY EXIT LANE AND INTERCHANGE IMPROVEMENTS. WIDEN FROM 1 TO 2 LANES AND ADD AN EXIT/STORAGE LANE. PLUS SIGHT DISTANCE IMPROV. TO N/B OFF RAMP.	WIDEN FROM 1 TO 2 LANES AND ADD AN EXIT/STORAGE LANE PLUS SIGHT DISTANCE IMPROVEMENT TO NORTHBOUND ON RAMP	√	√		√						
OR	S	CALTRANS	2M01108		5	15.2	16.5	I-5 SB	La Paz Road	Oso Parkway	EXTEND AUXILIARY LANE THROUGH INTERCHANGE	Existing Configuration: aux drops at La Paz, and resumes south of La Paz									√	

* S = State Hwy, L = Local Hwy, T = Transit
** The actual completion date may vary, e.g. a project completed in 2016 would have a network year of 2020.

$ In Thousands

ProjectID	County	Air Basin		RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	
ORA010200	Orange	SCAB		ORA010200	NCRH1	1	4.32	4.32	S	EXEMPT	0	
							PTC	1,417	Agency	DANA POINT		

PACIFIC COAST HWY @ DEL OBISPO, WIDEN INTERSECTION, ADD ADDITIONAL THRU LANE IN EACH DIRECTION, ADD BUS TURNOUT AND ALL ASSOCIATED IMPROVEMENTS. (00-DPNT-IIP-3059)

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
ORANGE M - IIP			1,417	1,417	1,417							1,417
ORA010200 Total			1,417	1,417	1,417							1,417

ProjectID	County	Air Basin		RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	
ORA120326	Orange	SCAB		ORA120326	NCRT3	5	.01	1.6	S	NON-EXEMPT	24	
							PTC	84,514	Agency	SAN JUAN CAPISTRANO		

RECONSTRUCT I-5/SR-74 INTERCHANGE (IN SAN JUAN CAPISTRANO, ON ROUTE 74 FROM ROUTE 5 TO EAST OF THE CITY LIMIT. RECONSTRUCT THE ROUTE 74 AND ROUTE 5 INTERCHANGE) PPNO 4102 DUAL LEAD SJC CALTRANS

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
CITY FUNDS			20,000	20,000						20,000		20,000
ORANGE M - REG I/C	2,500			2,500	2,500							2,500
STATE CASH - RIP	4,873	31,753	25,388	62,014		36,626				25,388		62,014
ORA120326 Total	7,373	31,753	45,388	84,514	2,500	36,626				45,388		84,514

ProjectID	County	Air Basin		RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	
ORA120402	Orange	SCAB		ORA120402	NCR42	5	1.4	1.6	S	EXEMPT	0	
							PTC	3,196	Agency	ORANGE COUNTY TRANS AUTHORITY (OCTA)		

IN SAN CLEMENTE NORTHBOUND INTERSTATE 5 AT AVENIDA VAQUERO - SOUNDWALL DESIGN AND CONSTRUCTION PPNO 2580A. DUAL LEAD AGENCY. OCTA FOR PA&ED AND PS&E CALTRAN LEAD FOR ROW CON

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
STATE CASH - RIP	620	30	2,546	3,196	650	2,546						3,196
ORA120402 Total	620	30	2,546	3,196	650	2,546						3,196

ProjectID	County	Air Basin		RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	
*ORA990929	Orange	SCAB		2M0714	CAY69	5	3.3	8.7	S	NON-EXEMPT	33	
							PTC	21,108	Agency	ORANGE COUNTY TRANS AUTHORITY (OCTA)		

I-5 Avenida Pico to Pacific Coast Highway - Add 1 HOV lane in each direction and Avenida Pico Interchange Improvement EA#0F960K, 2M0714

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
INTERSTATE MAINTENANC - EARMARK	1,173			1,173			935	238				1,173
ORANGE M2 - FREEWAY	19,000			19,000			2,000	2,000	5,000	5,000	5,000	19,000
ORA990929 Total	20,173			20,173			2,935	2,238	5,000	5,000	5,000	20,173

ProjectID	County	Air Basin		RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	
ORA020111	Orange	SCAB		--no data--	NCRH3	5	3.4	3.6	S	NON-EXEMPT	0	
							PTC	7,276	Agency	ORANGE COUNTY TRANS AUTHORITY (OCTA)		

I-5 AT AVENIDA PICO SOUTHBOUND OFF RAMP WIDENING FROM 1 TO 2 LANES AND EXTEND THE EXISTING AUX LANE TO CONNECT WITH S/B AUX LANE VISTA HERMOSA ON RAMP.

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
NATIONAL HWY SYSTEM - RIP	1,918		5,358	7,276	7,276							7,276

C. EMFAC Model Run

Title : Existing
Version : CT-EMFAC 2.6
Run Date : 12 November 2009 03:37 PM
Scen Year : 2009
Season : Annual
Temperature : 68F
Relative Humidity: 59%
Area : Orange County

==========

Running Exhaust Emissions (grams/mile)

Pollutant Name : Diesel_PM

speed(mph)	Emission Factor
5	0.039025
10	0.027685
15	0.019460
20	0.014455
25	0.012110
30	0.010360
35	0.009135
40	0.008400
45	0.008155
50	0.008295
55	0.008855
60	0.009835
65	0.011200
70	0.012985
75	0.015190

Pollutant Name : FORMALDEHYDE

speed(mph)	Emission Factor
5	0.032307
10	0.019850
15	0.011798
20	0.007800
25	0.006271
30	0.005198
35	0.004477
40	0.004023
45	0.003819
50	0.003846
55	0.004118
60	0.004653
65	0.005490
70	0.006347
75	0.007555

Pollutant Name : CO2

speed(mph)	Emission Factor
5	1,181.685000
10	896.677000

15	707.084000
20	579.472000
25	494.662000
30	437.789000
35	401.291000
40	380.684000
45	373.584000
50	379.228000
55	398.318000
60	433.162000
65	488.152000
70	494.257000
75	503.962000

Pollutant Name : BUTADIENE

speed(mph)	Emission Factor
5	0.003611
10	0.002435
15	0.001718
20	0.001282
25	0.001017
30	0.000848
35	0.000745
40	0.000684
45	0.000661
50	0.000671
55	0.000720
60	0.000812
65	0.000959
70	0.001069
75	0.001245

Pollutant Name : BENZENE

speed(mph)	Emission Factor
5	0.017549
10	0.011665
15	0.008041
20	0.005913
25	0.004693
30	0.003906
35	0.003418
40	0.003128
45	0.003011
50	0.003053
55	0.003267
60	0.003678
65	0.004337
70	0.004833
75	0.005609

Pollutant Name : ACROLEIN

speed(mph)	Emission Factor
5	0.000784
10	0.000535
15	0.000384
20	0.000290
25	0.000229

30	0.000191
35	0.000168
40	0.000154
45	0.000149
50	0.000152
55	0.000162
60	0.000183
65	0.000216
70	0.000239
75	0.000276

Pollutant Name : ACETALDEHYDE

speed(mph)	Emission Factor
5	0.013366
10	0.008029
15	0.004540
20	0.002878
25	0.002328
30	0.001928
35	0.001651
40	0.001473
45	0.001391
50	0.001398
55	0.001500
60	0.001699
65	0.002009
70	0.002367
75	0.002858

Idling Emissions (grams/idle-hour) (Currently NOT Available)

Evaporative Running Loss Emissions (grams/minute)

Pollutant Name : FORMALDEHYDE

time(min)	Emission Factor
1	0.000000
2	0.000000
3	0.000000
4	0.000000
5	0.000000
10	0.000000
15	0.000000
20	0.000000
25	0.000000
30	0.000000
35	0.000000
40	0.000000
45	0.000000
50	0.000000
55	0.000000

60	0.000000

Pollutant Name : BUTADIENE

time(min)	Emission Factor
1	0.000011
2	0.000006
3	0.000005
4	0.000004
5	0.000004
10	0.000003
15	0.000003
20	0.000003
25	0.000003
30	0.000003
35	0.000003
40	0.000003
45	0.000003
50	0.000003
55	0.000003
60	0.000003

Pollutant Name : BENZENE

time(min)	Emission Factor
1	0.001612
2	0.000924
3	0.000714
4	0.000619
5	0.000570
10	0.000479
15	0.000457
20	0.000456
25	0.000464
30	0.000462
35	0.000454
40	0.000452
45	0.000449
50	0.000442
55	0.000431
60	0.000424

Pollutant Name : ACROLEIN

time(min)	Emission Factor
1	0.000000
2	0.000000
3	0.000000
4	0.000000
5	0.000000
10	0.000000
15	0.000000
20	0.000000
25	0.000000
30	0.000000
35	0.000000
40	0.000000
45	0.000000
50	0.000000
55	0.000000

60	0.000000

Pollutant Name : ACETALDEHYDE

time(min)	Emission Factor
1	0.000000
2	0.000000
3	0.000000
4	0.000000
5	0.000000
10	0.000000
15	0.000000
20	0.000000
25	0.000000
30	0.000000
35	0.000000
40	0.000000
45	0.000000
50	0.000000
55	0.000000
60	0.000000

END---

Title : Future
Version : CT-EMFAC 2.6
Run Date : 12 November 2009 03:31 PM
Scen Year : 2040
Season : Annual
Temperature : 68F
Relative Humidity: 59%
Area : Orange County

==========

Running Exhaust Emissions (grams/mile)

Pollutant Name : Diesel_PM

speed(mph)	Emission Factor
5	0.008052
10	0.006512
15	0.005368
20	0.004532
25	0.003960
30	0.003608
35	0.003388
40	0.003300
45	0.003344
50	0.003476
55	0.003696
60	0.004004
65	0.004400
70	0.004884
75	0.005456

Pollutant Name : FORMALDEHYDE

speed(mph)	Emission Factor
5	0.010467
10	0.006184
15	0.003505
20	0.002355
25	0.001992
30	0.001712
35	0.001500
40	0.001347
45	0.001240
50	0.001179
55	0.001171
60	0.001207
65	0.001311
70	0.001455
75	0.001700

Pollutant Name : CO2

speed(mph)	Emission Factor
5	1,232.163000
10	935.946000

15	738.149000
20	604.949000
25	517.903000
30	459.353000
35	421.611000
40	400.126000
45	392.485000
50	397.919000
55	417.145000
60	452.516000
65	508.510000
70	516.703000
75	529.630000

Pollutant Name : BUTADIENE

speed(mph)	Emission Factor
5	0.000633
10	0.000412
15	0.000280
20	0.000207
25	0.000166
30	0.000139
35	0.000123
40	0.000115
45	0.000112
50	0.000116
55	0.000129
60	0.000148
65	0.000181
70	0.000217
75	0.000276

Pollutant Name : BENZENE

speed(mph)	Emission Factor
5	0.003521
10	0.002238
15	0.001463
20	0.001058
25	0.000856
30	0.000719
35	0.000633
40	0.000586
45	0.000564
50	0.000576
55	0.000627
60	0.000707
65	0.000846
70	0.001001
75	0.001254

Pollutant Name : ACROLEIN

speed(mph)	Emission Factor
5	0.000124
10	0.000083
15	0.000058
20	0.000044
25	0.000035

30	0.000029
35	0.000026
40	0.000024
45	0.000024
50	0.000025
55	0.000028
60	0.000032
65	0.000040
70	0.000048
75	0.000061

Pollutant Name : ACETALDEHYDE

speed(mph)	Emission Factor
5	0.004771
10	0.002785
15	0.001537
20	0.001017
25	0.000869
30	0.000751
35	0.000658
40	0.000587
45	0.000536
50	0.000501
55	0.000487
60	0.000490
65	0.000516
70	0.000562
75	0.000642

Idling Emissions (grams/idle-hour) (Currently NOT Available)

Evaporative Running Loss Emissions (grams/minute)

Pollutant Name : FORMALDEHYDE

time(min)	Emission Factor
1	0.000000
2	0.000000
3	0.000000
4	0.000000
5	0.000000
10	0.000000
15	0.000000
20	0.000000
25	0.000000
30	0.000000
35	0.000000
40	0.000000
45	0.000000
50	0.000000
55	0.000000

60	0.000000

Pollutant Name : BUTADIENE

time(min)	Emission Factor
1	0.000006
2	0.000003
3	0.000002
4	0.000002
5	0.000002
10	0.000001
15	0.000001
20	0.000001
25	0.000001
30	0.000001
35	0.000001
40	0.000001
45	0.000001
50	0.000001
55	0.000001
60	0.000001

Pollutant Name : BENZENE

time(min)	Emission Factor
1	0.000862
2	0.000453
3	0.000332
4	0.000282
5	0.000254
10	0.000198
15	0.000190
20	0.000181
25	0.000181
30	0.000179
35	0.000176
40	0.000176
45	0.000175
50	0.000174
55	0.000167
60	0.000167

Pollutant Name : ACROLEIN

time(min)	Emission Factor
1	0.000000
2	0.000000
3	0.000000
4	0.000000
5	0.000000
10	0.000000
15	0.000000
20	0.000000
25	0.000000
30	0.000000
35	0.000000
40	0.000000
45	0.000000
50	0.000000
55	0.000000

60	0.000000

Pollutant Name : ACETALDEHYDE

time(min)	Emission Factor
1	0.000000
2	0.000000
3	0.000000
4	0.000000
5	0.000000
10	0.000000
15	0.000000
20	0.000000
25	0.000000
30	0.000000
35	0.000000
40	0.000000
45	0.000000
50	0.000000
55	0.000000
60	0.000000

END----------

Title : 2040
Version : CT-EMFAC 2.6
Run Date : 16 November 2009 01:25 PM
Scen Year : 2009
Season : Annual
Temperature : 68F
Relative Humidity : 59%
Area : Orange County

Peak User Input :

Total VMT	Volume (vph)	Road Length(mi)	Number of Hours
10810373.6			

VMT Distribution(%) by Speed(mph)

(mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	>75
%															100

Offpeak User Input:

Total VMT	Volume (vph)	Road Length(mi)	Number of Hours

VMT Distribution(%) by Speed(mph)

(mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	>75
%															

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Running Exhaust Emissions (grams)

Pollutant Name : Diesel_PM

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.039025	0.00	0.00	0.000000
10	0.027685	0.00	0.00	0.000000
15	0.019460	0.00	0.00	0.000000
20	0.014455	0.00	0.00	0.000000
25	0.012110	0.00	0.00	0.000000
30	0.010360	0.00	0.00	0.000000
35	0.009135	0.00	0.00	0.000000
40	0.008400	0.00	0.00	0.000000
45	0.008155	0.00	0.00	0.000000
50	0.008295	0.00	0.00	0.000000
55	0.008855	0.00	0.00	0.000000

60	0.009835	0.00	
0.00	0.000000		
65	0.011200	10,810,373.60	
100.00	121,076.184320		
70	0.012985	0.00	
0.00	0.000000		
75	0.015190	0.00	
0.00	0.000000		
Total		10,810,373.60	
100.00	121,076.184320		

Pollutant Name : FORMALDEHYDE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.032307	0.00		
0.00	0.000000			
10	0.019850	0.00		
0.00	0.000000			
15	0.011798	0.00		
0.00	0.000000			
20	0.007800	0.00		
0.00	0.000000			
25	0.006271	0.00		
0.00	0.000000			
30	0.005198	0.00		
0.00	0.000000			
35	0.004477	0.00		
0.00	0.000000			
40	0.004023	0.00		
0.00	0.000000			
45	0.003819	0.00		
0.00	0.000000			
50	0.003846	0.00		
0.00	0.000000			
55	0.004118	0.00		
0.00	0.000000			
60	0.004653	0.00		
0.00	0.000000			
65	0.005490	10,810,373.60		
100.00	59,348.951064			
70	0.006347	0.00		
0.00	0.000000			
75	0.007555	0.00		
0.00	0.000000			
Total		10,810,373.60		
100.00	59,348.951064			

Pollutant Name : CO2

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	1,181.685000	0.00		
0.00	0.000000			
10	896.677000	0.00		
0.00	0.000000			
15	707.084000	0.00		
0.00	0.000000			
20	579.472000	0.00		
0.00	0.000000			

25	494.662000	0.00	
0.00	0.000000		
30	437.789000	0.00	
0.00	0.000000		
35	401.291000	0.00	
0.00	0.000000		
40	380.684000	0.00	
0.00	0.000000		
45	373.584000	0.00	
0.00	0.000000		
50	379.228000	0.00	
0.00	0.000000		
55	398.318000	0.00	
0.00	0.000000		
60	433.162000	0.00	
0.00	0.000000		
65	488.152000	10,810,373.60	
100.00	5,277,105,493.587200		
70	494.257000	0.00	
0.00	0.000000		
75	503.962000	0.00	
0.00	0.000000		
Total		10,810,373.60	
100.00	5,277,105,493.587200		

Pollutant Name : BUTADIENE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)
Emissions by Speed			
5	0.003611	0.00	
0.00	0.000000		
10	0.002435	0.00	
0.00	0.000000		
15	0.001718	0.00	
0.00	0.000000		
20	0.001282	0.00	
0.00	0.000000		
25	0.001017	0.00	
0.00	0.000000		
30	0.000848	0.00	
0.00	0.000000		
35	0.000745	0.00	
0.00	0.000000		
40	0.000684	0.00	
0.00	0.000000		
45	0.000661	0.00	
0.00	0.000000		
50	0.000671	0.00	
0.00	0.000000		
55	0.000720	0.00	
0.00	0.000000		
60	0.000812	0.00	
0.00	0.000000		
65	0.000959	10,810,373.60	
100.00	10,367.148282		
70	0.001069	0.00	
0.00	0.000000		
75	0.001245	0.00	
0.00	0.000000		
Total		10,810,373.60	
100.00	10,367.148282		

Pollutant Name : BENZENE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.017549	0.00		
0.00		0.000000		
10	0.011665	0.00		
0.00		0.000000		
15	0.008041	0.00		
0.00		0.000000		
20	0.005913	0.00		
0.00		0.000000		
25	0.004693	0.00		
0.00		0.000000		
30	0.003906	0.00		
0.00		0.000000		
35	0.003418	0.00		
0.00		0.000000		
40	0.003128	0.00		
0.00		0.000000		
45	0.003011	0.00		
0.00		0.000000		
50	0.003053	0.00		
0.00		0.000000		
55	0.003267	0.00		
0.00		0.000000		
60	0.003678	0.00		
0.00		0.000000		
65	0.004337	10,810,373.60		
100.00		46,884.590303		
70	0.004833	0.00		
0.00		0.000000		
75	0.005609	0.00		
0.00		0.000000		
Total		10,810,373.60		
100.00		46,884.590303		

Pollutant Name : ACROLEIN

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.000784	0.00		
0.00		0.000000		
10	0.000535	0.00		
0.00		0.000000		
15	0.000384	0.00		
0.00		0.000000		
20	0.000290	0.00		
0.00		0.000000		
25	0.000229	0.00		
0.00		0.000000		
30	0.000191	0.00		
0.00		0.000000		
35	0.000168	0.00		
0.00		0.000000		
40	0.000154	0.00		
0.00		0.000000		
45	0.000149	0.00		
0.00		0.000000		
50	0.000152	0.00		
0.00		0.000000		

55	0.000162	0.00	
0.00	0.000000		
60	0.000183	0.00	
0.00	0.000000		
65	0.000216	10,810,373.60	
100.00	2,335.040698		
70	0.000239	0.00	
0.00	0.000000		
75	0.000276	0.00	
0.00	0.000000		
Total		10,810,373.60	
100.00	2,335.040698		

Pollutant Name : ACETALDEHYDE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)
Emissions by Speed			
5	0.013366	0.00	
0.00	0.000000		
10	0.008029	0.00	
0.00	0.000000		
15	0.004540	0.00	
0.00	0.000000		
20	0.002878	0.00	
0.00	0.000000		
25	0.002328	0.00	
0.00	0.000000		
30	0.001928	0.00	
0.00	0.000000		
35	0.001651	0.00	
0.00	0.000000		
40	0.001473	0.00	
0.00	0.000000		
45	0.001391	0.00	
0.00	0.000000		
50	0.001398	0.00	
0.00	0.000000		
55	0.001500	0.00	
0.00	0.000000		
60	0.001699	0.00	
0.00	0.000000		
65	0.002009	10,810,373.60	
100.00	21,718.040562		
70	0.002367	0.00	
0.00	0.000000		
75	0.002858	0.00	
0.00	0.000000		
Total		10,810,373.60	
100.00	21,718.040562		

Idling Emissions (grams) (Currently NOT Available)

Evaporative Running Loss Emissions (grams)

Pollutant Name : FORMALDEHYDE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	166,313.44	0.000000

Pollutant Name : BUTADIENE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000003	166,313.44	29.936419

Pollutant Name : BENZENE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000424	166,313.44	4,231.013914

Pollutant Name : ACROLEIN

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	166,313.44	0.000000

Pollutant Name : ACETALDEHYDE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	166,313.44	0.000000

Total Emissions

Pollutant Name	Total Emissions (grams)	Total Emissions (Kilograms)	Total Emissions (US Tons)
Diesel_PM	121,076.184320	121.076184	0.133463647
FORMALDEHYDE	59,348.951064	59.348951	0.065421020
CO2	5,277,105,493.587200	5,277,105.493587	5,817.013074522
BUTADIENE	10,397.084702	10.397085	0.011460824

BENZENE	51,115.604217	51.115604
0.056345309		
ACROLEIN	2,335.040698	2.335041
0.002573942		
ACETALDEHYDE	21,718.040562	21.718041
0.023940042		

END---

Title : I-5 no build
Version : CT-EMFAC 2.6
Run Date : 08 February 2010 02:30 PM
Scen Year : 2040
Season : Annual
Temperature : 68F
Relative Humidity : 59%
Area : Orange County

Peak User Input :

Total VMT	Volume (vph)	Road Length(mi)	Number of Hours
836946			

VMT Distribution(%) by Speed(mph)

(mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	>75
%															
	98													2	

Offpeak User Input:

Total VMT	Volume (vph)	Road Length(mi)	Number of Hours
10809079			

VMT Distribution(%) by Speed(mph)

(mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	>75
%															
	98													2	

==========

Running Exhaust Emissions (grams)

Pollutant Name : Diesel_PM

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.003471	0.00	0.00	0.000000
10	0.002734	0.00	0.00	0.000000
15	0.002197	0.00	0.00	0.000000
20	0.001822	0.00	0.00	0.000000
25	0.001548	0.00	0.00	0.000000
30	0.001374	0.00	0.00	0.000000
35	0.001263	0.00	0.00	0.000000
40	0.001161	0.00	0.00	0.000000
45	0.001165	0.00	0.00	0.000000
50	0.001156	0.00	0.00	0.000000
55	0.001200	0.00	0.00	0.000000

60	0.001264	0.00	
0.00	0.000000		
65	0.001340	11,413,104.50	
98.00	15,293.560030		
70	0.001469	232,920.50	
2.00	342.160215		
75	0.001618	0.00	
0.00	0.000000		
Total		11,646,025.00	
100.00	15,635.720245		

Pollutant Name : FORMALDEHYDE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.003783	0.00		
0.00	0.000000			
10	0.002411	0.00		
0.00	0.000000			
15	0.001561	0.00		
0.00	0.000000			
20	0.001135	0.00		
0.00	0.000000			
25	0.000938	0.00		
0.00	0.000000			
30	0.000801	0.00		
0.00	0.000000			
35	0.000707	0.00		
0.00	0.000000			
40	0.000652	0.00		
0.00	0.000000			
45	0.000620	0.00		
0.00	0.000000			
50	0.000621	0.00		
0.00	0.000000			
55	0.000658	0.00		
0.00	0.000000			
60	0.000723	0.00		
0.00	0.000000			
65	0.000844	11,413,104.50		
98.00	9,632.660198			
70	0.000998	232,920.50		
2.00	232.454659			
75	0.001251	0.00		
0.00	0.000000			
Total		11,646,025.00		
100.00	9,865.114857			

Pollutant Name : BUTADIENE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.000545	0.00		
0.00	0.000000			
10	0.000364	0.00		
0.00	0.000000			
15	0.000257	0.00		
0.00	0.000000			
20	0.000194	0.00		
0.00	0.000000			

25	0.000156	0.00	
0.00	0.000000		
30	0.000131	0.00	
0.00	0.000000		
35	0.000117	0.00	
0.00	0.000000		
40	0.000111	0.00	
0.00	0.000000		
45	0.000109	0.00	
0.00	0.000000		
50	0.000115	0.00	
0.00	0.000000		
55	0.000131	0.00	
0.00	0.000000		
60	0.000153	0.00	
0.00	0.000000		
65	0.000189	11,413,104.50	
98.00	2,157.076751		
70	0.000232	232,920.50	
2.00	54.037556		
75	0.000302	0.00	
0.00	0.000000		
Total		11,646,025.00	
100.00	2,211.114307		

Pollutant Name : BENZENE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.002602	0.00		
0.00	0.000000			
10	0.001726	0.00		
0.00	0.000000			
15	0.001204	0.00		
0.00	0.000000			
20	0.000903	0.00		
0.00	0.000000			
25	0.000725	0.00		
0.00	0.000000			
30	0.000610	0.00		
0.00	0.000000			
35	0.000540	0.00		
0.00	0.000000			
40	0.000510	0.00		
0.00	0.000000			
45	0.000500	0.00		
0.00	0.000000			
50	0.000525	0.00		
0.00	0.000000			
55	0.000590	0.00		
0.00	0.000000			
60	0.000682	0.00		
0.00	0.000000			
65	0.000839	11,413,104.50		
98.00	9,575.594676			
70	0.001020	232,920.50		
2.00	237.578910			
75	0.001317	0.00		
0.00	0.000000			
Total		11,646,025.00		
100.00	9,813.173586			

Pollutant Name : ACROLEIN

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.000123	0.00		
0.00			0.000000	
10	0.000083	0.00		
0.00			0.000000	
15	0.000059	0.00		
0.00			0.000000	
20	0.000044	0.00		
0.00			0.000000	
25	0.000035	0.00		
0.00			0.000000	
30	0.000030	0.00		
0.00			0.000000	
35	0.000026	0.00		
0.00			0.000000	
40	0.000025	0.00		
0.00			0.000000	
45	0.000025	0.00		
0.00			0.000000	
50	0.000026	0.00		
0.00			0.000000	
55	0.000030	0.00		
0.00			0.000000	
60	0.000035	0.00		
0.00			0.000000	
65	0.000043	11,413,104.50		
98.00			490.763494	
70	0.000053	232,920.50		
2.00			12.344787	
75	0.000069	0.00		
0.00			0.000000	
Total		11,646,025.00		
100.00			503.108280	

Pollutant Name : ACETALDEHYDE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.001434	0.00		
0.00			0.000000	
10	0.000901	0.00		
0.00			0.000000	
15	0.000565	0.00		
0.00			0.000000	
20	0.000406	0.00		
0.00			0.000000	
25	0.000341	0.00		
0.00			0.000000	
30	0.000293	0.00		
0.00			0.000000	
35	0.000259	0.00		
0.00			0.000000	
40	0.000236	0.00		
0.00			0.000000	
45	0.000222	0.00		
0.00			0.000000	
50	0.000218	0.00		
0.00			0.000000	

55	0.000224	0.00	
0.00	0.000000		
60	0.000240	0.00	
0.00	0.000000		
65	0.000272	11,413,104.50	
98.00	3,104.364424		
70	0.000318	232,920.50	
2.00	74.068719		
75	0.000393	0.00	
0.00	0.000000		
Total		11,646,025.00	
100.00	3,178.433143		

Idling Emissions (grams) (Currently NOT Available)

Evaporative Running Loss Emissions (grams)

Pollutant Name : FORMALDEHYDE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	178,913.66	0.000000

Pollutant Name : BUTADIENE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000001	178,913.66	10.734820

Pollutant Name : BENZENE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000157	178,913.66	1,685.366666

Pollutant Name : ACROLEIN

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	178,913.66	0.000000

Pollutant Name : ACETALDEHYDE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	178,913.66	0.000000

Total Emissions

Pollutant Name	Total Emissions (grams)	Total Emissions (Kilograms)	Total Emissions (US Tons)
Diesel_PM	15,635.720245	15.635720	0.017235431
FORMALDEHYDE	9,865.114857	9.865115	0.010874428
BUTADIENE	2,221.849126	2.221849	0.002449169
BENZENE	11,498.540251	11.498540	0.012674971
ACROLEIN	503.108280	0.503108	0.000554582
ACETALDEHYDE	3,178.433143	3.178433	0.003503623

END----------

Title : I-5 build
Version : CT-EMFAC 2.6
Run Date : 08 February 2010 02:22 PM
Scen Year : 2040
Season : Annual
Temperature : 68F
Relative Humidity : 59%
Area : Orange County

Peak User Input :

Total VMT	Volume (vph)	Road Length(mi)	Number of Hours
836487			

VMT Distribution(%) by Speed(mph)

(mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	>75
%															
	98													2	

Offpeak User Input:

Total VMT	Volume (vph)	Road Length(mi)	Number of Hours
10810374			

VMT Distribution(%) by Speed(mph)

(mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	>75
%															
	98													2	

==========

Running Exhaust Emissions (grams)

Pollutant Name : Diesel_PM

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.003471	0.00	0.00	0.000000
10	0.002734	0.00	0.00	0.000000
15	0.002197	0.00	0.00	0.000000
20	0.001822	0.00	0.00	0.000000
25	0.001548	0.00	0.00	0.000000
30	0.001374	0.00	0.00	0.000000
35	0.001263	0.00	0.00	0.000000
40	0.001161	0.00	0.00	0.000000
45	0.001165	0.00	0.00	0.000000
50	0.001156	0.00	0.00	0.000000
55	0.001200	0.00	0.00	0.000000

60	0.001264	0.00	
0.00	0.000000		
65	0.001340	11,413,923.78	
98.00	15,294.657865		
70	0.001469	232,937.22	
2.00	342.184776		
75	0.001618	0.00	
0.00	0.000000		
Total		11,646,861.00	
100.00	15,636.842641		

Pollutant Name : FORMALDEHYDE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.003783	0.00		
0.00	0.000000			
10	0.002411	0.00		
0.00	0.000000			
15	0.001561	0.00		
0.00	0.000000			
20	0.001135	0.00		
0.00	0.000000			
25	0.000938	0.00		
0.00	0.000000			
30	0.000801	0.00		
0.00	0.000000			
35	0.000707	0.00		
0.00	0.000000			
40	0.000652	0.00		
0.00	0.000000			
45	0.000620	0.00		
0.00	0.000000			
50	0.000621	0.00		
0.00	0.000000			
55	0.000658	0.00		
0.00	0.000000			
60	0.000723	0.00		
0.00	0.000000			
65	0.000844	11,413,923.78		
98.00	9,633.351670			
70	0.000998	232,937.22		
2.00	232.471346			
75	0.001251	0.00		
0.00	0.000000			
Total		11,646,861.00		
100.00	9,865.823016			

Pollutant Name : BUTADIENE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.000545	0.00		
0.00	0.000000			
10	0.000364	0.00		
0.00	0.000000			
15	0.000257	0.00		
0.00	0.000000			
20	0.000194	0.00		
0.00	0.000000			

25	0.000156	0.00	
0.00	0.000000		
30	0.000131	0.00	
0.00	0.000000		
35	0.000117	0.00	
0.00	0.000000		
40	0.000111	0.00	
0.00	0.000000		
45	0.000109	0.00	
0.00	0.000000		
50	0.000115	0.00	
0.00	0.000000		
55	0.000131	0.00	
0.00	0.000000		
60	0.000153	0.00	
0.00	0.000000		
65	0.000189	11,413,923.78	
98.00	2,157.231594		
70	0.000232	232,937.22	
2.00	54.041435		
75	0.000302	0.00	
0.00	0.000000		
Total		11,646,861.00	
100.00	2,211.273029		

Pollutant Name : BENZENE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.002602	0.00		
0.00	0.000000			
10	0.001726	0.00		
0.00	0.000000			
15	0.001204	0.00		
0.00	0.000000			
20	0.000903	0.00		
0.00	0.000000			
25	0.000725	0.00		
0.00	0.000000			
30	0.000610	0.00		
0.00	0.000000			
35	0.000540	0.00		
0.00	0.000000			
40	0.000510	0.00		
0.00	0.000000			
45	0.000500	0.00		
0.00	0.000000			
50	0.000525	0.00		
0.00	0.000000			
55	0.000590	0.00		
0.00	0.000000			
60	0.000682	0.00		
0.00	0.000000			
65	0.000839	11,413,923.78		
98.00	9,576.282051			
70	0.001020	232,937.22		
2.00	237.595964			
75	0.001317	0.00		
0.00	0.000000			
Total		11,646,861.00		
100.00	9,813.878016			

Pollutant Name : ACROLEIN

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.000123	0.00		
0.00	0.000000			
10	0.000083	0.00		
0.00	0.000000			
15	0.000059	0.00		
0.00	0.000000			
20	0.000044	0.00		
0.00	0.000000			
25	0.000035	0.00		
0.00	0.000000			
30	0.000030	0.00		
0.00	0.000000			
35	0.000026	0.00		
0.00	0.000000			
40	0.000025	0.00		
0.00	0.000000			
45	0.000025	0.00		
0.00	0.000000			
50	0.000026	0.00		
0.00	0.000000			
55	0.000030	0.00		
0.00	0.000000			
60	0.000035	0.00		
0.00	0.000000			
65	0.000043	11,413,923.78		
98.00	490.798723			
70	0.000053	232,937.22		
2.00	12.345673			
75	0.000069	0.00		
0.00	0.000000			
Total		11,646,861.00		
100.00	503.144395			

Pollutant Name : ACETALDEHYDE

speed(mph)	Emission Factor(grams/mile)	VMT by Speed	VMT-Speed Distribution (%)	Emissions by Speed
5	0.001434	0.00		
0.00	0.000000			
10	0.000901	0.00		
0.00	0.000000			
15	0.000565	0.00		
0.00	0.000000			
20	0.000406	0.00		
0.00	0.000000			
25	0.000341	0.00		
0.00	0.000000			
30	0.000293	0.00		
0.00	0.000000			
35	0.000259	0.00		
0.00	0.000000			
40	0.000236	0.00		
0.00	0.000000			
45	0.000222	0.00		
0.00	0.000000			
50	0.000218	0.00		
0.00	0.000000			

55	0.000224	0.00	
0.00	0.000000		
60	0.000240	0.00	
0.00	0.000000		
65	0.000272	11,413,923.78	
98.00	3,104.587268		
70	0.000318	232,937.22	
2.00	74.074036		
75	0.000393	0.00	
0.00	0.000000		
Total		11,646,861.00	
100.00	3,178.661304		

Idling Emissions (grams) (Currently NOT Available)

Evaporative Running Loss Emissions (grams)

Pollutant Name : FORMALDEHYDE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	178,926.50	0.000000

Pollutant Name : BUTADIENE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000001	178,926.50	10.735590

Pollutant Name : BENZENE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000157	178,926.50	1,685.487648

Pollutant Name : ACROLEIN

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	178,926.50	0.000000

Pollutant Name : ACETALDEHYDE

Emission Factor(grams/min)	total running time(hrs)	Emissions
0.000000	178,926.50	0.000000

Total Emissions

Pollutant Name	Total Emissions (grams)	Total Emissions (Kilograms)	Total Emissions (US Tons)
Diesel_PM	15,636.842641	15.636843	0.017236669
FORMALDEHYDE	9,865.823016	9.865823	0.010875208
BUTADIENE	2,222.008620	2.222009	0.002449345
BENZENE	11,499.365664	11.499366	0.012675881
ACROLEIN	503.144395	0.503144	0.000554622
ACETALDEHYDE	3,178.661304	3.178661	0.003503874

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