Air Quality Technical Report

For The

SOUTH ORANGE COUNTY TRANSPORTATION INFRASTRUCTURE IMPROVEMENT PROJECT

COUNTY OF ORANGE

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PREFACE

The alternatives considered for the South Orange County Transportation Infrastructure Improvement Project (SOCTIIP) are described in detail in the following technical report:

Project Alternatives Technical Report (P&D Consultants, June 2003).

The alternatives include a number of build alternatives including extensions to the existing Foothill Transportation Corridor, improvements to Interstate 5 and arterial highway improvements.

A number of individual technical reports were prepared to assess the potential environmental impacts of the SOCTIIP alternatives. Each of the following reports describes the study area for the individual parameter, existing conditions, study methodology, short and long term adverse and beneficial effects of the SOCTIIP alternatives and appropriate mitigation measures.

Aesthetics/Visual Resources Technical Report (P&D Consultants).
Air Quality Technical Report (Mestre Greve Associates, December 2003).
Cultural Resources Technical Report (Greenwood and Associates).
Earth Resources Technical Report (GeoPentech).
Hazardous Materials Technical Report (P&D Consultants).
Hydrology Study (Psomas).
Land Use Technical Report (P&D Consultants).
Location Hydraulic Studies (Psomas).
Military Impacts Technical Report (P&D Consultants).
Natural Environment Study (Biological Resources and Wetlands Functional Assessment) (P&D Consultants).
Noise Technical Report (Mestre Greve Associates).
Paleontological Resources Technical Report (RMW Paleo Associates).
Public Services and Utilities Technical Report (P&D Consultants).
Recreation Resources Technical Report (P&D Consultants).
Relocation Impacts Technical Report (P&D Consultants).
Right-of-Way Cost Estimates Technical Report (P&D Consultants).
Runoff Management Plan Technical Report (Psomas).
Socioeconomics and Growth Inducing Technical Report (P&D Consultants).
Traffic and Circulation Technical Report (Austin Foust Associates).

These technical reports are available for review at the Transportation Corridor Agency office.

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G.1 ACRONYMS FOR THE BUILD ALTERNATIVES

There are a number of build alternatives considered for the South Orange County Transportation Infrastructure Improvement Project. The acronyms for the build alternatives are listed below.

Far East Corridor – Complete - Initial Alternative	FEC-Initial Alternative
Far East Corridor – Complete - Ultimate Alternative	FEC-Ultimate Alternative
Far East Corridor - Talega Variation - Initial Alternative	FEC-TV-Initial Alternative
Far East Corridor - Talega Variation - Ultimate Alternative	FEC-TV-Ultimate Alternative
Far East Corridor - Cristianitos Variation - Initial Alternative	FEC-CV-Initial Alternative
Far East Corridor - Cristianitos Variation - Ultimate Alternative	FEC-CV-Ultimate Alternative
Far East Corridor - Agricultural Fields Variation - Initial Alternative	FEC-AFV-Initial Alternative
Far East Corridor - Agricultural Fields Variation - Ultimate Alternative	FEC-AFV-Ultimate Alternative
Far East Corridor - Ortega Highway Variation - Initial Alternative	FEC-OHV-Initial Alternative
Far East Corridor - Ortega Highway Variation – Ult. Alternative	FEC-OHV-Ultimate Alternative
Far East Corridor - Avenida Pico Variation - Initial Alternative	FEC-APV-Initial Alternative
Far East Corridor - Avenida Pico Variation - Ultimate Alternative	FEC-APV-Ultimate Alternative
Far East Corridor – West – Initial Alternative	FEC-W-Initial Alternative
Far East Corridor – West – Ultimate Alternative	FEC-W-Ultimate Alternative
Far East Corridor – Modified – Initial Alternative	FEC-M-Initial Alternative
Far East Corridor – Modified – Ultimate Alternative	FEC-M-Ultimate Alternative
Central Corridor – Complete - Initial Alternative	CC-Initial Alternative
Central Corridor – Complete - Ultimate Alternative	CC-Ultimate Alternative
Central Corridor - Avenida La Pata Variation - Initial Alternative	CC-ALPV-Initial Alternative
Central Corridor - Avenida La Pata Variation - Ultimate Alternative	CC-ALPV-Ultimate Alternative
Central Corridor - Ortega Highway Variation - Initial Alternative	CC-OHV-Initial Alternative
Central Corridor - Ortega Highway Variation - Ultimate Alternative	CC-OHV-Ultimate Alternative
Alignment 7 Corridor – Complete - Initial Alternative	A7C-Initial Alternative
Alignment 7 Corridor – Complete - Ultimate Alternative	A7C-Ultimate Alternative
Alignment 7 Corridor- 7 Swing Variation - Initial Alternative	A7C-7SV-Initial Alternative
Alignment 7 Corridor- 7 Swing Variation - Ultimate Alternative	A7C-7SV-Ultimate Alternative
Alignment 7 Corridor - Far East Crossover Variation - Initial Alternative	A7C-FECV-Initial Alternative
Alignment 7 Corridor - Far East Crossover Variation – Ultimate Alternative	A7C-FECV-Ultimate Alternative
Alignment 7 Corridor - Far East Crossover (Cristianitos) Variation - Initial Alternative	A7C-FECV-C-Initial Alternative
Alignment 7 Corridor - Far East Crossover (Cristianitos) Variation - Ultimate Alternative	A7C-FECV-C-Ultimate Alternative
Alignment 7 Corridor - Far East Crossover (Agricultural Fields) Variation - Initial Alternative	A7C-FECV-AF-Initial Alternative
Alignment 7 Corridor - Far East Crossover (Agricultural Fields) Variation - Ultimate Alternative	A7C-FECV-AF-Ultimate Alternative
Alignment 7 Corridor - Ortega Highway Variation - Initial Alternative	A7C-OHV-Initial Alternative
Alignment 7 Corridor - Ortega Highway Variation - Ultimate Alternative	A7C-OHV-Ultimate Alternative

Alignment 7 Corridor - Avenida La Pata - Initial Alternative	A7C-ALPV-Initial Alternative
Alignment 7 Corridor - Avenida La Pata - Ultimate Alternative	A7C-ALPV-Ultimate Alternative
Arterial Improvements Only Alternative	AIO Alternative
Arterial Improvements Plus HOV and Spot Mixed-Flow Lanes on I-5 Alternative	AIP Alternative
I-5 Widening Alternative	I-5 Alternative
No Action Alternative-Orange County: Projections 2000	No Action Alternative-OCP-2000
No Action Alternative-Rancho Mission Viejo Development Plan	No Action Alternative-RMV

G.2 OTHER ACRONYMS

AAQS	Ambient Air Quality Standards
ADT	Average Daily Traffic
AAM	Annual Arithmetic Mean
AQMP	Air Quality Management Plan
avg.	average
Avd.	Avenida
C	Centigrade
CAA	Clean Air Act
CAA, CAAs	Community Analysis Area, Areas
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Register
CO	Carbon Monoxide
CO_2	Carbon Dioxide
Caltrans	California Department of Transportation
CalEPA	California Environmental Protection Agency
DON	Department of the Navy
du, dus	Dwelling unit(s)
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMFAC	Emission Factor Model
EPA	United States Environmental Protection Agency
F	Fahrenheit
FHWA	Federal Highway Administration
FTC	Foothill Transportation Corridor
FTC-S	Foothill Transportation Corridor – South

FTC-N	Foothill Transportation Corridor - North
ha	Hectare
HC	Hydrocarbons
HOV	High occupancy vehicle, vehicles
hr.	hour, hours
I-5	Interstate 5
I-15	Interstate 15
I-405	Interstate 405
km	Kilometer, kilometers
Kph	Kilometers per hour
LOS	Level of Service
LUE, LUE	Land Use Element, Elements
MCB	Marine Corps Base
MF	Motor failed
mi	mile, miles
MOU	Memorandum of Understanding
MPAH	Master Plan of Arterial Highways
mph	miles per hour
MPO	Metropolitan Planning Organization
ND, N.D.	No data
NEPA	National Environmental Policy Act
NM	Not monitored
NMHC	Non-Methane Hydrocarbons
No.	Number
NO	Nitrogen oxide
NOx	Nitrogen oxides
NO_2	Nitrogen Dioxide
O_3	Ozone
OCP-2000	Orange County Projections - 2000
PF	Power failure
PC	Planned Community
Pb	Lead
PM10	Particulate Matter Under 10 Microns
PM2.5	Particulate Matter Under 2.5 Microns
PPM	Parts Per Million
Pkwy.	Parkway
RHC	Reactive Hydrocarbons

RMV	Rancho Mission Viejo
ROC	Reactive Organic Compounds
ROG	Reactive Organic Gases
RTP	Regional Transportation Plan
RTIP	Regional Transportation Improvement Plan
SANDAG	San Diego Association of Governments
SDG&E	San Diego Gas and Electric
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SDAPCD	San Diego County Air Pollution Control District
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
SOCTIIP	South Orange County Transportation Infrastructure Improvement Project
SR 241	State Route 241
SR 55	State Route 55
SR 73	State Route 73
SR 74	State Route 74
SR 91	State Route 91
TCA	Transportation Corridor Agencies/Agency
TIP	Transportation Improvement Plan
TOC	Total Organic Gases
TSP	Total Suspended Particulates
TSM	Transportation Systems Management
$\mu g/m^3$	micrograms per cubic meter
USEPA	United States Environmental Protection Agency
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
V/C	Volume to capacity ratio

G.3 MEASUREMENTS

The measurement units in this report are expressed in both metric and English units, with metric units followed by English units in parentheses. For ease of translation, the following conversions are included to allow the reader to better understand the measurements in the report.

English/Metric Conversion	**Metric/English Conversion**
AREA	**AREA**
1 square foot = 0.093 square meters 1 acre = 0.405 hectares, 4,047 square meters 1 square mile(640 acres = 2.59 square kilometers	1 square meter = 10.752 square feet 1 hectare = 2.469 acres 1 square kilometer = 0.386 square miles
LENGTH	**LENGTH**
1 inch = 2.54 centimeters	1 centimeter = 0.394 inch
1 foot = 30.480 centimeters or 0.305 meters	--
1 yard = 0.914 meters	1 meter = 1.094 yards
1 mile = 1.609 kilometers	1 kilometer = 0.621 mile

EXECUTIVE SUMMARY

The South Orange County Transportation Infrastructure Improvement Project (SOCTIIP) lies primarily in the South Coast Air Basin (SCAB). The Far East Corridor Alternatives, some variants of the Central Corridor Alternative, and some alternatives that include widening of Interstate 5 (I-5) have small segments in northern San Diego County. The segments of the SOCTIIP alternatives in San Diego County are in the extreme northern reaches of the San Diego Air Basin, which shares similar meteorological conditions with the adjacent Orange County areas.

The climate in the area is typical of most southern California coastal areas. Occasional periods of stagnation, bright sunlight and elevated inversions in the summer can lead to elevated levels of regional pollutants such as ozone (O_3). Clear cold winter evenings, ground based inversions, and occasional stagnant conditions can lead to higher levels of primary pollutants, such as carbon monoxide, trapped near their source along roads.

All levels of government are actively involved in the air management efforts for the SOCTIIP area. The United States Environmental Protection Agency has established ambient air quality standards (AAQS) and has established requirements to insure that federal projects conform to the goals of the Clean Air Act. The California Air Resources Board has taken the lead at the state level to establish additional ambient air quality standards, and is responsible for the State Implementation Plan (SIP) which charts the measures to be taken to meet the AAQS. At the regional level, the South Coast Air Quality Management District (SCAQMD) and the Southern California Association of Governments (SCAG) are responsible for developing the part of the SIP for the SCAB, and the San Diego County Air Pollution Control District (SDAPCD) is responsible for the San Diego County part of the SIP.

Receptors sensitive to air pollution are located throughout the SOCTIIP study area. Areas along I-5 are almost completely developed with homes, schools and businesses. The SOCTIIP build alternatives (e.g., Far East Corridor alternatives, Central Corridor alternatives, and the Alignment 7 alternatives) also pass near developed areas, but to a lesser extent than the I-5 Widening Alternative, and the Arterial Improvements Alternatives (refer to Section 3.4.9).

Air quality monitoring has been conducted for many years by the SCAQMD and the SDAPCD. Additional monitoring was conducted for the Transportation Corridor Agency (TCA) in late 1995 and early 1996 in the area along the Central and Far East corridor alignments. The data indicate that O_3 levels in the vicinity of the project currently exceed state and federal AAQS a few days each year. Data also show that the recently adopted PM2.5 and 8-hour ozone standards are also regularly exceeded. The state standard for particulate matter (PM10) is exceeded for many days each year; however, the federal PM10 standard is not exceeded. The other ambient air quality standards for carbon monoxide, nitrogen dioxide, lead and hydrogen sulfide are not exceeded in the SOCTIIP area.

The federal Clean Air Act and the state's California Clean Air Act (CCAA) rank the basins' air quality with respect to the ambient air quality standards. The attainment status for both SCAB and SDAB are summarized in Table ES-1.

Table ES-1
Attainment Status of the South Coast Air Basin and the San Diego Air Basin

Area	Pollutant	Federal Designation	State Designation
SCAB	Ozone	Extreme non-attainment	Extreme non-attainment
	CO	Serious non-attainment[1]	Serious non-attainment
	PM-10	Serious non-attainment	Serious non-attainment
	NO_2	Attainment	Attainment
	SOx	Attainment/Maintenance	Attainment/Maintenance
SDAB	Ozone	Attainment/Maintenance	Serious non-attainment
	CO	Attainment/Maintenance	Attainment/Maintenance
	PM-10	Unclassifiable	Non-attainment
	NO_2 and SOx	Attainment/Maintenance	Attainment/Maintenance

Source: California Air Resource Board (6/03)
San Diego Air Pollution Control District (1/02)
Notes: 1. SCAB has met the criteria for CO attainment, but has not yet been redesignated as an attainment area by EPA.

Potential air quality impacts of the SOCTIIP alternatives fall into five major categories:

Construction Impacts. Particulates are generated during grading, demolition and excavation activities. Gaseous and particulate emissions are emitted from heavy equipment, trucks and employee vehicles used during the construction phases of the SOCTIIP build alternatives.

Operational Regional/Subregional Impacts. Increases or decreases in regional/subregional emissions may result from changes in vehicle miles traveled or changes in speeds for the SOCTIIP build alternatives compared to the No Action Alternatives.

Operational Local Impacts. Increases in carbon monoxide exceedances or an increase in the severity of exceedances as a result of increased traffic or congestion at intersections are assessed. The effects of various speed assumptions, toll versus toll-free conditions, and interim year impacts are also considered. The potential for PM10 hot spots is also considered.

Cumulative Impacts. Cumulative impacts were examined with the further development of the roadway network to the full MPAH/RTP and the expanded development of Rancho Mission Viejo.

Consistency/Conformity with Regional Air Planning. Consistency of the project alternatives with the AQMP and conformity with the Clean Air Act (CAA) are addressed.

Construction Impacts. The emissions generated by the construction of the SOCTIIP are projected to be substantial for all pollutants for all project alternatives. The I-5 alternative generates the greatest amount of emissions while the AIO alternative generates the least amount of emissions. The increases for all alternatives are substantially greater than the CEQA thresholds identified by the South Coast Air Quality Management District. Ideally, the thresholds are designed to be the lower limit of emissions that could results in significant changes in concentrations. The fact that the emissions are projected to exceed the thresholds implies that there will be increases in the concentrations of these pollutants that would be measurable. The increases would be local to the construction activities and would be temporary. However, the increases in pollutant concentrations are not a federal conformity issue. It would only become an issue if there was construction in one location over a five year period (40 CFR 93-123), and this will not be the situation. Mitigation measures are recommended to the greatest extent possible. The mitigation measures recommended for construction activities are listed in Section 6.1.

Operational Regional/Subregional Impacts. Regional and subregional operational emissions are calculated for CEQA purposes. The changes in subregional traffic emissions with the various alternatives are presented in Figures ES-1 and ES-2. The emission change with respect to the No Action Alternative is presented for 2025 with the committed roadway network and with Rancho Mission Viejo (RMV) at 14,000 dwelling units. Four charts are presented, one each for hydrocarbons (HC), carbon monoxide (CO), nitrogen oxides (NOx), and respirable particulate (PM10).

The first chart shows changes in comparison to the corresponding No Action Alternative for HC. HC emissions decrease for all alternatives. Some alternatives show larger decreases than other alternatives. The alternatives that show the largest decreases in HC emissions are FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, CC, A7C, A7C-FECV (including the A7C-FEC-M), and A7-FECV-C. All of the alternatives listed in the previous sentence had a decrease of at least 25 kg. per day (55 lbs. per day). These alternatives showed the greatest increases in speed for the travel network, and higher speeds result in lower HC emissions. The seven alternatives listed would have substantial benefit on HC emissions for the region/subregion in comparison to the No Action alternative.

The second chart shows the changes in emissions for CO. All the alternatives show a decrease in CO emissions in comparison to the No Action Alternative. Some alternatives show greater decreases in CO emissions than others. Those with decreases greater than 550 pounds per day include FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, FEC-APV, CC, CC-ALPV, A7C, A7C-FECV (including the A7C-FEC-M), and A7-FECV-C. These nine alternatives would have a substantial benefit on CO levels for the region. Emission rates decrease with increasing speed, and these alternatives generally reflect those alternatives where the greatest increases in speed occur.

NOx emissions are presented in Figure ES-2. All alternatives show an increase in NOx emissions, except for two alternatives which show a slight decrease in emissions. Several alternatives have increases in emissions above 25 kilograms per day (55 pounds per day), and these increases should be considered an adverse impact. Alternatives which have increases greater than 25 kilograms per day (55 pounds per day) include FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, FEC-APV, CC, A7C, A7C-FECV (including the A7C-FEC-M), A7-FECV-C, AIP, and the I-5. No alternatives have decreases greater than 25 kilograms per day (55 lbs. per day). NOx emissions are highest for very slow speeds (less than 25 mph or 42 kph) and for high speeds (55 mph or 92 kph, and higher). The increases in emissions generally reflect more vehicles traveling at higher speeds.

The PM10 emission changes are also presented in Figure ES-2. Most of the alternatives show a slight increase in PM10 emissions, and some show a slight decrease in emissions. None of the increases or decreases is greater than 68 kilograms per day (150 pounds per day), and so none of the changes should be considered substantial.

Operational Local Impacts. For all build alternatives, the future CO emissions are projected to be in compliance with the 1-hour and 8-hour state and federal AAQS, and therefore, none of the build alternatives will result in an adverse impact on CO levels. In general, the project alternatives resulted in lower concentrations at affected intersections than did the No Action Alternative. Existing conditions, opening year (2008), ten years after opening (2018), and the planning horizon year (2025) were all considered. The year 2025 generally resulted in the highest concentrations, but well below the standards. Toll and toll-free conditions were assessed. Changes in concentrations were generally minor between the two cases, and none resulted in exceedances of the standard. Speed sensitivity runs were made for the tollways. The higher speeds resulted in slightly higher concentrations, but again no exceedances were forecast. None of the build alternatives will result in local air quality impacts.

A qualitative PM10 local air quality assessment was performed per the "Guidance for Qualitative Project Level "Hot Spot" Analysis in PM-10 Nonattainment and Maintenance Areas," (by the Federal Highway Administration, September 2001). This analysis was performed to satisfy transportation conformity requirements and was performed in a manner consistent with FHWA policy. The qualitative analysis of PM10 hot spots indicate that the number and severity of PM10 hot spots would not be increased, and in fact would likely be decreased, with the project alternatives in comparison to the No Action alternatives.

Cumulative Impacts. Cumulative impacts would occur with the further development of the roadway network to the full MPAH/RTP and buildout in accordance with OCP-2000. The analysis includes buildout of OCP-2000 (RMV at 21,000 dwellings) and the buildout of the MPAH/RTP. In general, the cumulative impacts parallel the impacts described above for the regional/subregional impacts. Increases in NOx will be substantial for all alternatives, while CO and HC will decrease considerably.

Consistency/Conformity with Regional Planning. Consistency of the project with the AQMP and conformity with the SIP are addressed. These two items are not the same. Consistency with the AQMP is a requirement of the California Environmental Quality Act (CEQA). Conformity is a federal Clean Air Act requirement.

40 C.F.R. 93.109, (part of the EPA Conformity Regulations) provides a summary of conformity requirements in Table 1 – Conformity Criteria. The table lists four criteria specifically for projects from a conforming RTP and TIP. The first criteria is detailed in Section 93.114 and requires that there is a "currently conforming transportation plan and TIP." The second criteria is that the project is "from a conforming plan and TIP," and this is detailed in Section 93.115. Alternatives which are not consistent with the RTIP Design Concept and may exceed the emissions assumed in the AQMP are the FEC-OHV, FEC-APV, CC-ALPV, CC-OHV, A7C-ALPV, A7C-OHV, AIO, AIP, and I-5 Widening. (The final emission calculations for the conformity determination will be done by the MPO.) The third criteria comes from Section 93.116, and has to do with localized CO and PM10 hot spots. The analysis concluded that none of the alternatives would result in exceedances of the Federal AAQS or cause substantial increases in concentrations. The fourth criteria concerns PM10 control measures and is detailed in Section 93.117. The regulations require that the project "must comply with PM10 control measures in the applicable implementation plan." The applicable control measures have been identified in Section 4.5.1 and necessary mitigation measures are specified in Section 6.0 – Mitigation Measures. In summary, all of the relevant conformity requirements have been addressed and a positive conformity finding should be made for all alternatives except the FEC-OHV, FEC-APV, CC-ALPV, CC-OHV, A7C-ALPV, A7C-OHV, AIO, AIP, and I-5 Widening. Only emission estimates directly from the metropolitan planning organization (MPO) will be used by the FHWA as a basis for its conformity finding. Additionally, if an alternative is selected that is not in conformity, then appropriate documents might be modified by the MPO to add the project so that a positive conformity finding could result.

Mitigation Measures. Mitigation measures are presented for the control of construction generated emissions. Measures that reduce the generation of particulate matter are recommended along with controls for construction equipment and employee generated travel. Two measures are also presented for the control of operational emissions. The measures are aimed at controlling particulate matter from unpaved roads that connect to the project and timely removal of dirt and debris from roadways to prevent them from being entrained into the atmosphere. These last two measures are necessary to insure consistency with the AQMP.

Summary. Table ES-2 summarizes the potential air quality impacts of the SOCTIIP Alternatives discussed above. Only the primary alternatives are included in this table. The analysis indicates that the variants of the primary alternatives generally have the same air quality impacts as the primary alternatives.

TABLE ES-2
SUMMARY OF AIR QUALITY IMPACTS

	ALTERNATIVES					
	Far East Complete	Central Complete	Alignment A 7 Corridor	Arterial Improvements Only	I-5 Widening	No Action Alternatives
Construction Impacts[1]: Does the alternative exceed the threshold limits?	Yes	Yes	Yes	Yes	Yes	No
Regional/Subregional Impacts[1]: Does the alternative substantially increase the emissions of one or more pollutants in comparison to No Action?	Yes[2]	Yes[2]	Yes[2]	Yes[2]	Yes[2]	No
Local Impacts: Does the alternative increase the number or severity of air standard exceedances?	No	No	No	No	No	No
Cumulative Impacts: Does the alternative in combination with other projects substantially increase the emissions of one or more pollutants?	Yes	Yes	Yes	Yes	Yes	No
Consistency/Conformity: Is the alternative consistent with regional planning?	Yes	Yes	Yes	No	No	No

1. These analyses are presented primarily to satisfy CEQA requirements.
2. The alternative results in higher emissions of NOx in comparison to the No Action Alternative, but results in significantly lower emissions of HC and CO than would the No Action Alternative.

SECTION 1.0
INTRODUCTION

The South Orange County Transportation Infrastructure Improvement Project (SOCTIIP) is located in south-central and southwestern Orange County and northern San Diego County. Under consideration are five primary build alternatives: the Far East Corridor, Central Corridor, Alignment 7 Corridor, Arterial Improvements Only Alternative and the I-5 Widening Alternative. There are additional alternatives which are variations of these primary build alternatives. Two No Action Alternatives are also being considered. Short segments of the Far East Corridor, Alignment 7 Corridor, the I-5 Widening, and the Arterial Improvements Plus HOV lie in San Diego County where they cross Marine Corps Base (MCB) Camp Pendleton and connect with I-5. The SOCTIIP build and No Action Alternatives are discussed in more detail in Section 2.0 (Description of the Alternatives).

The air quality analysis provides information on the current air quality conditions and the climate that affects the day to day levels of air pollutants. Background information on the federal, state and local air planning efforts are provided. The impacts section of the air assessment examines both short term, construction and long term impacts on air quality. Impacts are examined on a regional, sub-regional and local basis. Consistency with air quality planning goals is also assessed. Impacts due to the SOCTIIP build alternatives as well as cumulative impacts of reasonably foreseeable development in the SOCTIIP area are considered. When impacts are identified, mitigation measures are evaluated and presented as appropriate.

SECTION 2.0
DESCRIPTION OF THE ALTERNATIVES

2.1 INTRODUCTION

This section describes the alternatives for the South Orange County Transportation Infrastructure Improvement Project (SOCTIIP). A detailed discussion of the project alternatives is provided in the Project Alternatives Technical Report (July 2003).

2.2 BUILD ALTERNATIVES

2.2.1 OVERVIEW OF THE BUILD ALTERNATIVES

The proposed project involves locating and constructing transportation improvements in south Orange County and north San Diego County. The alternatives under consideration consist of transportation improvement alternatives and two No Action Alternatives. The transportation improvement alternatives include widening of Interstate 5 (I-5), arterial road improvements with and without widening I-5, and toll road corridors which would be southern extensions of the existing State Route 241 (SR 241). SR 241 is one of three existing Orange County toll road corridors operated by the Transportation Corridor Agency (TCA). The northern segment of SR 241 begins at an interchange with Oso Parkway and extends north to State Route 91 (SR 91) in northeast Orange County. The corridor alternatives would extend SR 241 south from its existing terminus at Oso Parkway south to approximately the Orange/San Diego County border. Figure 2-1 presents the alternatives. (More detailed exhibits can be found in the Appendix.)

Two major categories of build alternatives are considered in this technical report:

- Build alternatives which propose a southern extension of the existing SR 241, in south Orange County. The corridor extension alternatives being evaluated propose the extension of existing SR 241 south from its existing terminus at Oso Parkway to I-5 in the vicinity of the Orange/San Diego County line. This proposed segment of the corridor is frequently referred to as the Foothill Transportation Corridor-South (FTC-South or FTC-S). The corridor alternatives all propose extension of existing SR 241 south of Oso Parkway, to I-5 or to an intersecting arterial south of Oso Parkway.

- Three build alternatives which propose improvements to existing I-5 and/or to Master Plan of Arterial Highways (MPAH) arterials in south Orange County. These Alternatives do not include any extension of existing SR 241 south of Oso Parkway.

- Initial and Ultimate Alternatives are proposed for the Build Alternatives. The Initial Corridor Alternatives consist of four general purpose lanes and could accommodate two HOV lanes. Six general purpose lanes and two HOV lanes would be provided for the Ultimate Alternatives (SOCTIIP Traffic and Circulation Technical Report, Austin-Foust Associates, July 2003).

In addition, two No Action Alternatives, with different land use and transportation system assumptions, are also described in this section.

The corridor, arterial and I-5 widening alternatives are described in the following sections.

2.2.1.1 Far East Corridor Alternatives

Eight Far East Corridor (FEC) alignments, totaling 16 FEC alternatives, are proposed for evaluation. Those alternatives are listed below and are discussed in detail in the following sections.

2.2.1.1.1 Far East Corridor - Initial Alternatives

Far East Corridor – Complete - Initial (FEC- Initial) Alternative

Far East Corridor - Talega Variation - Initial (FEC-TV-Initial) Alternative

Far East Corridor - Cristianitos Variation - Initial (FEC-CV-Initial) Alternative

Far East Corridor - Agricultural Fields Variation - Initial (FEC-AFV-Initial) Alternative

Far East Corridor - Ortega Highway Variation - Initial (FEC-OHV-Initial) Alternative

Far East Corridor - Avenida Pico Variation - Initial (FEC-APV-Initial) Alternative

Far East Corridor – West - Initial (FECW- Initial) Alternative

Far East Corridor – Modified - Initial (FECM- Initial) Alternative

2.2.1.1.2 Far East Corridor - Ultimate Alternatives

Far East Corridor – Complete - Ultimate (FEC-Ultimate) Alternative

Far East Corridor - Talega Variation - Ultimate (FEC-TV-Ultimate) Alternative

Far East Corridor - Cristianitos Variation - Ultimate (FEC-CV-Ultimate) Alternative

Far East Corridor - Agricultural Fields Variation - Ultimate (FEC-AFV-Ultimate) Alternative

Far East Corridor - Ortega Highway Variation - Ultimate (FEC-OHV-Ultimate) Alternative

Far East Corridor - Avenida Pico Variation - Ultimate (FEC-APV-Ultimate) Alternative

Far East Corridor – West - Ultimate (FECW- Ultimate) Alternative

Far East Corridor – Modified - Ultimate (FECM- Ultimate) Alternative

2.2.1.1.3 Far East Corridor Alignment (FEC)

The alignment of the FEC-Initial and Ultimate Alternatives generally follows the alignment of the alternative previously referred to as the CP Alignment in the earlier TCA EIR #3 (October 1991) for this project. The corridor under the FEC Alternatives is approximately 26 kilometers (km) (16 miles (mi)) long, with an additional approximately 1.9 km (1.2 mi) of improvements on I-5.

2.2.1.1.4 Alignment of the Far East Corridor - Talega Variation (FEC-TV)-Initial and Ultimate Alternatives

The FEC-TV-Initial and Ultimate Alternatives alignment follows the alignment of the FEC Alternatives from Oso Parkway to south of Ortega Highway. From Ortega Highway, the FEC-TV Alternatives extend southwest across the north part of the Rancho Mission Viejo (RMV) Land Conservancy and enter the City of San Clemente approximately 3.2 km (2.0 mi) east of the City of San Juan Capistrano. The FEC-TV alignment then crosses the Talega Valley Planned Community (PC), crossing Avenida Vista Hermosa approximately 0.5 km (0.3 mi) north of Avenida Pico to approximately 0.4 km (0.3 mi) south of Avenida La Pata. From south of Avenida La Pata, the FEC-TV Alternatives extend southwest, traversing land owned by the City of San Clemente and several existing residential developments. The corridor continues parallel to and northwest of Avenida Pico, to direct connectors at I-5, 0.9 km (0.6 mi) south of Avenida Pico. This alignment then extends 4.6 km (2.9 mi) south on I-5 to the terminus just north of Cristianitos Road.

2.2.1.1.5 Alignment of the FEC-CV Alternatives

The alignment of the FEC-CV Alternatives follows the alignment of the FEC Alternatives from Oso Parkway to just after it crosses into San Onofre State Park, south of Avenida Pico. From that point, the FEC-CV Alternatives become an undivided four lane arterial highway south to I-5. The corridor under the FEC-CV Alternative is approximately 24 km (15 mi) long. The FEC-CV Alternatives become a four lane undivided collector road just south of the Avenida Pico interchange. From that interchange, the FEC-CV alignment proceeds south to join the existing Cristianitos Road alignment south of the Camp Pendleton Guard Gate to the interchange of Cristianitos Road and I-5. These alternatives include widening and reconstruction of existing Cristianitos Road south of the Camp Pendleton Guard Gate south to I-5 and reconstruction of the existing I-5/Cristianitos Road interchange.

2.2.1.1.6 Alignment of the FEC-AFV Alternatives

The alignment of the FEC-AFV Alternatives follows the alignment of the FEC Alternatives from Oso Parkway to just after it crosses into the San Onofre State Beach Park, south of Avenida Pico. The corridor under the FEC-AFV Alternatives is approximately 26 km (16 mi) long, with an additional approximately 1.9 km (1.2 mi) of improvements to I-5. The corridor extends southeast from just south of Avenida Pico as it crosses the Orange/San Diego County line. This Segment extends southeast through

San Onofre State Beach on Marine Corps Base (MCB) Camp Pendleton and crosses Cristianitos Road 0.8 km (0.5 mi) southwest of San Mateo Road. It crosses San Mateo Creek just west of Cristianitos Creek and traverses the agricultural leased land on MCB Camp Pendleton east of San Mateo Creek to the intersection of the corridor with I-5. The corridor crosses San Mateo Creek and extends southeast to I-5, with direct connectors at I-5 1.0 km (0.6 mi) south of Basilone Road. I-5 would be widened from 1.0 km (0.6 mi) south of Basilone Road to 2.9 km (1.8 mi) south of Basilone Road.

2.2.1.1.7 Alignment of the FEC-OHV Alternatives

The alignment of the FEC-OHV Alternatives follows the alignment of the other FEC Alternatives, from Oso Parkway to Ortega Highway. The FEC-OHV Alternatives propose a corridor segment from Oso Parkway to Ortega Highway only. Ortega Highway is currently a two lane facility at the corridor. Under the MPAH, Ortega Highway is designated as a six lane major arterial. The FEC-OHV Alternatives do not propose any change to the MPAH designation or the number of travel lanes on Ortega Highway. The corridor under the FEC-OHV Alternatives is approximately 9 km (6 mi) long.

The FEC-OHV Alternatives incorporate Transportation Systems Management (TSM) technology improvements on Ortega Highway from the corridor terminus at Ortega Highway to I-5. The TSM strategies may include traffic signal coordination, real time traffic monitoring and surveillance, and traveler information. No additional lanes or road widening on Ortega Highway, beyond those improvements already assumed in the MPAH (four lanes on Ortega Highway), are assumed under these Alternatives. The TSM strategies may require construction within the existing Ortega Highway right-of-way to install surveillance, monitoring and information display equipment.

2.2.1.1.8 Alignment of the FEC-APV Alternatives

The alignment of the FEC-APV - Initial and Ultimate Alternatives follows the alignment of the FEC Alternatives from Oso Parkway to Avenida Pico. This is the only segment which would be constructed under these Alternatives. The corridor under the FEC-APV - Initial and Ultimate Alternatives is approximately 17 km (10 mi) long. The FEC-APV Alternatives incorporate TSM technology improvements on Avenida Pico from the corridor terminus at Avenida Pico to I-5. No additional lanes or road widening on Avenida Pico, beyond those improvements already assumed in the MPAH (six lanes on Avenida Pico), are assumed under these Alternatives. The TSM strategies may require construction within the existing Avenida Pico right-of-way to install surveillance, monitoring and information display equipment.

2.2.1.1.9 Alignment of the FEC-W Alternatives

The alignment of the FEC-W Alternatives follows the alignment of the other FEC Alternatives, from south of Avenido Pico to I-5 south of Basilone Road. From the existing terminus of the FTC-N at Oso Parkway, on the east side of Canada Chiquita to the southeast, the FEC-W alignment continues south of Coto de Caza, crossing Canada

Gobernadora approximately four km (2.5 mi) north of San Juan Creek. The FEC-W alignment continues at Ortega Highway approximately 4.0 km (2.5 mi) east of Antonio Parkway/Avenida La Pata. From Ortega Highway, the FEC-W alignment extends south traversing the west side of the Donna O'Neill Land Conservancy, extending southeast and crosses the southeast corner of the Talega Valley PC before terminating just south of Avenida Pico. The corridor under the FEC-W Alternatives is approximately 26 km (13 mi) long, with approximately 4.6 km (2.9 mi) of improvements on the I-5.

2.2.1.1.10 Alignment of the FEC-M Alternatives

The alignment of the FEC-M Alternatives follows the alignment of the other FEC Alternatives, from south of Avenido Pico to I-5 south of Basilone Road. The FEC-M alignment follows the FEC-W segment from the existing terminus of the FTC-N at Oso Parkway to north of San Juan Creek and terminates at Ortega Highway. Ortega Highway at the corridor crossing is currently a two lane facility. Under the MPAH, Ortega Highway is designated as a six lane Major Arterial. If Ortega Highway is not improved to the MPAH designation by the time these Alternatives are implemented, an approximately 1.4 km (0.9 mi) segment of Ortega Highway would be widened to the MPAH designation.

This Segment includes potential widening of approximately 1.4 km (0.9 mi) of Ortega Highway and construction of a new connector road approximately 1.8 km (1.1 mi) long extending north from Ortega Highway to the FEC alignment. The FEC-M alignment continues at Ortega Highway approximately 5.4 km (3.4 mi) east of Antonio Parkway/Avenida La Pata. From Ortega Highway, the FEC-M extends south, east of the RMV Land Conservancy and Cristianitos Creek, extending southwest and crossing Cristianitos Creek approximately 2.8 km (1.7 mi) north of the Orange /San Diego County line. The FEC-M crosses the southeast portion of the RMV Land Conservancy and the southeast corner of the Talega Valley PC before terminating just south of Avenida Pico. The corridor under the FEC-M Alternatives is approximately 26 km (16 mi) long, with approximately 1.3 km (0.8 mi) of improvements on the I-5.

2.2.1.2 Central Corridor Alternatives (CC)

Three Central Corridor (CC) alignments, totaling six CC alternatives, will be evaluated. Those alternatives are listed below and are discussed in detail later in this Section.

2.2.1.2.1 Central Corridor - Initial Alternatives

Central Corridor – Complete - Initial (CC-Initial) Alternative

Central Corridor - Avenida La Pata Variation - Initial (CC-ALPV-Initial) Alternative

Central Corridor - Ortega Highway Variation - Initial (CC-OHV-Initial) Alternative

2.2.1.2.2 Central Corridor - Ultimate Alternatives

Central Corridor – Complete - Ultimate (CC-Ultimate) Alternative

Central Corridor - Avenida La Pata Variation - Ultimate (CC-ALPV-Ultimate) Alternative

Central Corridor - Ortega Highway Variation - Ultimate (CC-OHV-Ultimate) Alternative

2.2.1.2.3 Alignment of the CC Alternatives

The alignment of the CC - Initial and Ultimate Alternatives generally follows the alignment of the alternative previously referred to as BX. The corridor under the CC Alternatives is approximately 19 km (12 mi) long, with an additional approximately 4.6 km (2.5 mi) of improvements on I-5. These Alternatives would also require widening (to the MPAH designation), but no realignment, of approximately 1.0 km (0.6 mi) of Ortega Highway. Ortega Highway at the corridor crossing is currently a two lane facility. Under the MPAH, Ortega Highway is designated as a six lane Major Arterial. If Ortega Highway is improved to the Major Arterial designation prior to the implementation of these Alternatives, no further widening of Ortega Highway would be required. If Ortega Highway is not improved to the MPAH designation by the time these Alternatives are implemented, an approximately 1.0 km (0.6 mi) segment of Ortega Highway would be widened, to the MPAH designation, as part of these Alternatives. These Alternatives would not result in the realignment of this same segment of Ortega Highway.

2.2.1.2.4 Alignment of the CC-ALPV Alternatives

The alignment of the CC-ALPV - Initial and Ultimate Alternatives follows the CC Alignment from the northern terminus at Oso Parkway south to Avenida Vista Hermosa. These alternatives terminate at Avenida Vista Hermosa. The corridor under the CC-ALPV Initial and Ultimate Alternatives is approximately 14 km (8.7 mi) long. The CC-ALPV Alternatives incorporate TSM technology improvements on Avenida Vista Hermosa from the corridor terminus at Avenida Vista Hermosa to Avenida La Pata, on Avenida La Pata from Avenida Vista Hermosa to Avenida Pico, and on Avenida Pico from Avenida La Pata to I-5. No additional lanes or road widening on Avenida Vista Hermosa, Avenida La Pata and Avenida Pico, beyond those improvements already assumed in the MPAH, are assumed under these Alternatives. The TSM strategies may require construction within the existing arterial rights-of-way to install surveillance, monitoring and information display equipment. These Alternatives would also include the potential widening (to the MPAH designation) of approximately 1.0 km (0.6 mi) of Ortega Highway.

2.2.1.2.5 Alignment of the CC-OHV Alternatives

The CC-OHV Alternatives include only the northern segment from Oso Parkway to Ortega Highway. The corridor under the CC-OHV Alternatives is approximately 8 km (5 mi) long. The CC-OHV Alternatives incorporate TSM technology improvements on Ortega Highway from the corridor terminus at Ortega Highway to I-5. No additional lanes or road widening on Ortega Highway, beyond those improvements already assumed in the MPAH (four lanes on Ortega Highway), are assumed under these Alternatives.

The TSM strategies may require construction within the existing Ortega Highway right-of-way to install surveillance, monitoring and information display equipment.

2.2.1.3 Alignment 7 Corridor Alternatives (A7C)

Eight Alignment 7 Corridor (A7C) corridor alignments, totaling 16 A7C alternatives, will be evaluated. Those alternatives are listed below and are discussed in detail in this Section.

2.2.1.3.1 Alignment 7 Corridor – Initial Alternatives

Alignment 7 Corridor – Complete - Initial (A7C-Initial) Alternative

Alignment 7 Corridor - 7 Swing Variation - Initial (A7C-7SV-Initial) Alternative

Alignment 7 Corridor - Far East Crossover Variation - Initial (A7C-FECV-Initial) Alternative

Alignment 7 Corridor - Far East Crossover - Modified - Initial (A7C-FEC-M-Initial) Alternative

Alignment 7 Corridor - Far East Crossover (Cristianitos) Variation - Initial (A7C-FECV-C-Initial) Alternative

Alignment 7 Corridor - Far East Crossover (Agricultural Fields) Variation - Initial (A7C-FECV-AF-Initial) Alternative

Alignment 7 Corridor - Ortega Highway Variation - Initial (A7C-OHV-Initial) Alternative

Alignment 7 Corridor - Avenida La Pata Variation - Initial (A7C-ALPV-Initial) Alternative

2.2.1.3.2 Alignment 7 Corridor - Ultimate Alternatives

Alignment 7 Corridor - Complete - Ultimate (A7C-Ultimate) Alternative

Alignment 7 Corridor - 7 Swing Variation - Ultimate (A7C-7SV-Ultimate) Alternative

Alignment 7 Corridor - Far East Crossover Variation - Ultimate (A7C-FECV-Ultimate)

Alternative Alignment 7 Corridor - Far East Crossover - Modified - Ultimate (A7C-FEC-M-Ultimate) Alternative

Alignment 7 Corridor - Far East Crossover (Cristianitos) Variation - Ultimate (A7C-FECV-C-Ultimate) Alternative

Alignment 7 Corridor - Far East Crossover (Agricultural Fields) Variation - Ultimate (A7C-FECV-AF-Ultimate) Alternative

Alignment 7 Corridor - Ortega Highway Variation - Ultimate (A7C-OHV-Ultimate) Alternative

Alignment 7 Corridor - Avenida La Pata Variation - Ultimate (A7C-ALPV-Ultimate) Alternative

2.2.1.3.3 Alignment of the A7C Alternatives

The corridor under the A7C Alternatives is approximately 19 km (11.8 mi) long, with an additional approximately 4.6 km (2.9 mi) of improvements on I-5. The northern segment of the A7C Alternatives extends from the existing terminus of the FTC-N at Oso Parkway, on the east side of Cañada Chiquita and east of the Cañada Chiquita Water Reclamation Plant. It then extends south, across San Juan Creek to Ortega Highway, approximately 1.7 km (1.1 miles) east of the intersection of Antonio Parkway/Avenida La Pata. This Segment includes construction of a new connector road approximately 2.2 km (1.4 mi) long, extending east from Antonio Parkway to the A7C alignment. The A7C Alternatives then extend south from Ortega Highway and across the Prima Deshecha Landfill, entering the City of San Clemente and crossing the Talega Valley Planned Community (PC). The corridor continues southeast to Avenida Vista Hermosa approximately 0.5 km (0.3 mile) northwest of Avenida Pico. From the crossing of Avenida Vistas Hermosa, the corridor extends southwest, traversing land owned by the City of San Clemente and several existing residential developments. It continues parallel to and northwest of Avenida Pico, to direct connectors at I-5.

2.2.1.3.4 Alignment of the A7C-7SV Alternatives

The alignment of the A7C-7SV-Initial and Ultimate Alternatives includes the northerly segment of A7C from Oso Parkway to Ortega Highway. The corridor under the A7C-7SV Alternatives is approximately 18 km (11 mi) long, with an additional approximately 4.6 km (2.9 mi) of improvements on I-5. The A7C-7SV Alternatives then extend from Ortega Highway south across the Prima Deshecha Landfill to Avenida Vista Hermosa, traversing land owned by the City of San Clemente. The A7C-7SV Alternatives then extend southwest from the crossing of Avenida La Pata, traversing several existing residential developments. The corridor continues parallel to and northwest of Avenida Pico, to direct connectors at I-5. This segment includes widening 4.6 km (2.9 mi) of I-5 south of Avenida Pico to just north of Cristianitos Road.

2.2.1.3.5 Alignment of the A7C-FECV Alternatives

The corridor under the A7C-FECV Alternatives is approximately 25 km (15 mi) long, with an additional approximately 1.9 km (1.2 mi) of improvements on I-5. The A7C-FECV Alternatives extend from the existing terminus of the FTC-N at Oso Parkway, on the east side of Cañada Chiquita and east of the Cañada Chiquita Water Reclamation Plant. It then extends south, across San Juan Creek to Ortega Highway, approximately

1.7 km (1.1 miles) east of the intersection of Antonio Parkway/Avenida La Pata. The corridor then extends from south of Ortega Highway, across Prima Deshecha Landfill, through the southeast corner of the Rolling Hills (Talega) PC, through the southeast corner of the RMV Land Conservancy and south to Avenida Pico. It then travels from Avenida Pico to the Orange/San Diego County line immediately west of the San Diego Gas and Electric (SDG&E) substation. The alignment travels south, crossing the inland part of San Onofre State Beach on MCB Camp Pendleton in San Diego County, extending across Cristianitos Road approximately 1.1 km (0.7 mi) north of I-5. This segment terminates where the corridor crosses San Mateo Creek. The corridor crosses San Mateo Creek and extends southeast to I-5, with direct connectors at I-5 1.0 km (0.6 mi) south of Basilone Road. I-5 would be widened from 1.0 km (0.6 mi) south of Basilone Road to 2.9 km (1.8 mi) south of Basilone Road.

2.2.1.3.6 Alignment of the A7C-FECV-C Alternatives

The corridor under the A7C-FEC-C Alternatives is approximately 23 km (14.3 mi) long. The corridor alignment follows the A7C alignment from Oso Parkway to Avenida Pico. The A7C-FECV-C Alternatives become a four lane undivided collector road south of the Avenida Pico interchange. From that interchange, the alignment would proceed south to join the existing Cristianitos Road alignment south of the Camp Pendleton Guard Gate to the interchange of Cristianitos Road and I-5. This segment includes widening and reconstruction of existing Cristianitos Road from south of the Camp Pendleton Guard Gate south to I-5 and reconstruction of the existing I-5/Cristianitos Road interchange.

2.2.1.3.7 Alignment of the A7C-FECV-AF Alternatives

The corridor under the A7C-FECV-AF Alternatives is approximately 25 km (15 miles) long. The A7C-FECV Alternatives follow the A7C alignment from the existing terminus of the FTC-N at Oso Parkway to Avenida Pico. The corridor then extends southeast from Avenida Pico as it crosses the Orange/San Diego County line. This segment then extends southeast through San Onofre State Beach on MCB Camp Pendleton, crossing Cristianitos Road 0.8 km (0.5 mi) southwest of San Mateo Road. It then crosses San Mateo Creek just west of Cristianitos Creek and traverses the agricultural leased land on MCB Camp Pendleton east of San Mateo Creek. The corridor extends southeast to I-5, with direct connectors between the corridor and I-5 1.0 km (0.6 mi) south of Basilone Road. I-5 would be widened from 1.0 km (0.6 mi) south of Basilone Road to 2.9 km (1.8 mi) south of Basilone Road.

2.2.1.3.8 Alignment of the A7C-OHV Alternatives

The A7C-OHV Alternatives extend from the existing terminus of the FTC-N at Oso Parkway, on the east side of Cañada Chiquita and east of the Cañada Chiquita Water Reclamation Plant. They then extend south, across San Juan Creek to Ortega Highway, east of the intersection of Antonio Parkway/Avenida La Pata. The A7C-OHV Alternatives incorporate TSM technology improvements on Ortega Highway from the corridor terminus at Ortega Highway to I-5. No additional lanes or road widening on Ortega Highway, beyond those improvements already assumed in the MPAH (four lanes on Ortega Highway), are assumed under these Alternatives. The corridor under the A7C-OHV Alternatives is approximately 7 km (4 mi) long.

2.2.1.3.9 Alignment of the A7C-ALPV Alternative

The A7C-ALPV Alternatives extend from the existing terminus of the FTC-N at Oso Parkway, on the east side of Cañada Chiquita and east of the Cañada Chiquita Water Reclamation Plant. It then travels south, across San Juan Creek to Ortega Highway, approximately 1.7 km (1.1 miles) east of the intersection of Antonio Parkway/Avenida La Pata. This segment includes construction of a new connector road approximately 2.2 km (1.4 mi) long, extending east from Antonio Parkway to the A7C-ALPV alignment. These alternatives then extend south from Ortega Highway and across the Prima Deshecha Landfill, entering the City of San Clemente and crossing the Talega Valley PC. These alternatives then extend southeast to Avenida Vista Hermosa approximately 0.5 km (0.3 mile) northwest of Avenida Pico. The A7C-ALPV Alternatives incorporate TSM technology improvements on Avenida Vista Hermosa from the corridor terminus at Avenida Vista Hermosa to Avenida La Pata, on Avenida La Pata from Avenida Vista Hermosa to Avenida Pico and on Avenida Pico from Avenida La Pata to I-5. No additional lanes or road widening on Avenida Vista Hermosa, Avenida La Pata or Avenida Pico, beyond those improvements already assumed in the MPAH, are assumed under these Alternatives.

2.2.1.3.10 Alignment of the A7C-FEC-M-Initial and Ultimate Alternatives

The corridor under the A7C-FECV-M Alternatives is approximately 26 km (16.2 mi) long, with an additional approximately 1.3 km (0.3 mi) of improvements on I-5. The A7C-FECV-M Alternatives extend from the existing terminus of the SR-241 at Oso Parkway, on the east side of Cañada Chiquita and east of the Chiquita Water Reclamation Plant. It then extends south, across San Juan Creek to Ortega Highway, approximately 2.1 km (1.3 mi) east of the intersection of Antonio Parkway/Avenida La Pata. This Segment includes construction of a new connector road approximately 2.2 km (1.4 mi) long, extending east from Antonio Parkway to the A7C alignment. The corridor then extends southeast from Ortega Highway, then south traversing the west side of the RMV Land Conservancy and then southeast and crosses the southeast corner of the Rolling Hills (Talega) PC to just south of Avenida Pico. It then travels from Avenida Pico to the Orange/San Diego County line immediately west of the San Diego Gas and Electric (SDG&E) substation. The alignment travels south, crossing the inland part of San Onofre State Beach on MCB Camp Pendleton in San Diego County, extending across Cristianitos Road approximately 1.1 km (0.7 mi) north of I-5. The corridor then crosses San Mateo Creek and extends southeast to I-5, with direct connectors at I-5 1.0 km (0.6 mi) south of Basilone Road. I-5 would be widened from 1.0 km (0.6 mi) south of Basilone Road to 2.9 km (1.8 mi) south of Basilone Road.

2.2.1.4 Arterial Improvements Alternatives (AIO and AIP)

As described earlier, there are two arterial improvement alternatives:

Arterial Improvements Only (AIO) Alternative

Arterial Improvements Plus HOV and Spot Mixed Flow Lanes (Auxiliary Lanes) on I-5 (AIP) Alternative

2.2.1.4.1 Arterial Improvements Under the AIO Alternative

The AIO Alternative assumes full build out of the MPAH and the Regional Transportation Plan (RTP). The AIO Alternative incorporates the following additional improvements to the transportation system:

- Expansion of Antonio Parkway/Avenida La Pata to an eight lane smart street improvements from Oso Parkway south to San Juan Creek Road, and to a six lane Smart Street from San Juan Creek Road south to Avenida Pico. Smart streets include a combination of advanced traffic management strategies such as traffic signal coordination, real time traffic monitoring and surveillance, and traveler information; and modest physical improvements such as additional turn lanes at intersections and select grade separations. Antonio Parkway/Avenida La Pata currently exists from south of Ortega Highway to the north. The MPAH shows Antonio Parkway/La Pata Avenue being extended south, to south of Avenida Pico, with a six or four lane cross section. The MPAH is a countywide plan for arterial roads, based on input from the incorporated Cities (from their General Plans), and the County of Orange and the Orange County Transportation Authority. The MPAH is incorporated in the RTP. The AIO Alternative proposes adding one lane in each direction on Antonio Parkway/ La Pata Avenue from Oso Parkway to San Juan Creek Road

- Smart street improvements/TSM strategies on Ortega Highway, Camino Las Ramblas and Avenida Pico between Antonio Parkway/Avenida La Pata and I-5.

- Focused improvements are proposed for the intersections of Antonio Parkway/Avenida La Pata with Avenida Pico, Ortega Highway, Crown Valley Parkway and Oso Parkway. These improvements would include either left turn flyovers or full grade separated intersections.

2.2.1.4.2 Arterial and I-5 Improvements Under the AIP Alternative

The AIP Alternative assumes full build out of the MPAH and the 2001 RTP. The AIP Alternative assumes the same arterial improvements described above for the AIO Alternative and would include the following additional improvements to the transportation system:

- The addition of one HOV lane on I-5 in each direction between El Toro Road and Cristianitos Road.

- The addition of spot mixed flow lanes on the segments of I-5 between San Juan Creek Road and Ortega Highway and between Avenida Pico and El Camino Real.

- Retaining walls may be provided in some locations along the widened arterial segments and I-5 under the AIP Alternative. The locations of the retaining walls will be refined in final design if a build alternative is selected for implementation.

A number of bridges, interchanges and other structures on the segment of the I-5 from south of the I-5/Interstate 405 to Cristianitos Road would be reconstructed.

2.2.1.5 I-5 Widening Alternative (I-5)

The I-5 Alternative assumes full build out of the MPAH and the 2001 RTP. The I-5 Alternative assumes the following improvements to I-5:

- The addition of either one or two general purpose lanes in each direction between Cristianitos Road and north of Lake Forest Drive; and the provision of one HOV lane in each direction, except where HOV lanes are already programmed between Camino Las Ramblas and Avenida Pico. Additional mixed flow (auxiliary) lanes will be provided on several segments of I-5.

- A number of bridges, interchanges and other structures on the segment of the I-5 from south of the I-5/I-405 to Cristianitos Road would be reconstructed.

2.2.1.6 No Action Alternatives

2.2.1.6.1 No Action Alternative OCP-2000

This No Action Alternative assumes the following:

- Build out of the Land Use Elements (LUEs) of the General Plans for the cities and unincorporated Orange County.

- Orange County Projections (OCP)-2000 population and employment projections for 2025, which assume substantial development in Community Analysis Areas (CAAs) 59, 60 and 70. This specifically assumes the construction of approximately 35,888 additional dwelling units (dus) in CAAs 59, 60 and 70 by 2025, including a total of 21,000 dus on the RMV site.

- Build out of the MPAH, with all arterials constructed to their ultimate cross sections consistent with the MPAH.

- Build out of the Regional Transportation Plan (RTP) improvements in South Orange County.

- No extension of the existing FTC south of its existing terminus at Oso Parkway.

- An on site circulation system on the RMV property, to support the 21,000 dus forecasted in OCP-2000. This on site circulation system will be defined conceptually in the traffic analysis.

2.2.1.6.2 No Action Alternative – Rancho Mission Viejo Development Plan

This No Action Alternative assumes:

- Build out of the LUEs of the General Plans for the cities and unincorporated Orange County.
- OCP-2000 population and employment projections for 2025, which assumed substantial development in CAAs 59, 60 and 70. Under this No Action Alternative, the 21,000 dus assumed on the RMV under OCP-2000 would be excluded and the 14,000 dus proposed on the RMV by the RMV Company would be included.
- No extension of the existing FTC south of its existing terminus at Oso Parkway.
- Build out of the MPAH, with all arterials constructed to their ultimate cross sections consistent with the MPAH.
- Build out of the RTP improvements in south Orange County.
- No extension of the existing FTC-North south of its existing terminus at Oso Parkway.

An on site circulation system on the RMV property, to support the 14,000 dus proposed by the Company, based on the on site circulation system defined by the RMV for the 14,000 du development plan.

SECTION 3.0
EXISTING ENVIRONMENT

3.1 INTRODUCTION

Except for the small segments of the Far East Corridor and Alignment 7 Corridor Alternatives, the I-5 Widening and Arterial Improvements with HOV Alternatives in San Diego County, all the South Orange County Transportation Infrastructure Improvement Program (SOCTIIP) build alternatives are in the South Coast Air Basin (SCAB). The SCAB is a 17,000 square kilometer (6,600 square mile) area which encompasses all of Orange County and the non-desert parts of Los Angeles, Riverside and San Bernardino Counties. The SCAB is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino and San Jacinto Mountains to the north and east. The SCAB's climate and topography, which are discussed below, make it highly conducive to the formation of air pollution. The segments of the corridor alternatives in San Diego County are in the most northern reaches of the San Diego Air Basin, which shares similar meteorological conditions with adjacent Orange County areas.

3.2 CLIMATE

3.2.1 REGIONAL

Meteorological conditions in the SCAB, such as light winds and shallow vertical mixing, and topographical features, such as surrounding mountain ranges, hinder the dispersal of air pollutants. The strength and location of a semipermanent, subtropical high pressure cell over the Pacific Ocean primarily control the climate of the SCAB. Climate is also affected by the moderating effects of the nearby oceanic heat reservoir. Warm summers, mild winters, infrequent rainfall, moderate daytime onshore breezes and moderate humidities characterize climatic conditions throughout most of the SCAB and adjacent areas of the San Diego Air Basin.

Differences in terrain create a number of microclimates within the overall climate. The pattern of mountains and hills is primarily responsible for the wide variations of rainfall, temperatures and localized winds that occur throughout the region. Temperature variations have an important influence on wind flow, dispersion along mountain ridges, vertical mixing and photochemistry. The moderating marine influence decreases with distance from the ocean, resulting in monthly and annual temperature spreads that are greatest inland and smallest at the coast. Precipitation is highly variable seasonally. Summers are often completely dry, with periods of four to five months without rain. In winter, occasional storms from high latitudes sweep across the coast, bringing rain. Annual rainfall is lowest in the coastal plain and inland valleys, higher in the foothills and highest in the mountains.

Frequent temperature inversions trap air pollutants in a limited atmospheric volume near the ground and hamper dispersion. In January, a surface inversion exists on 70 percent of the mornings. Average wind speed in the SCAB is less than 5 miles per hour (8 kilometers per hour) on 80 percent of the days during the summer smog season. This is a measure of daily stagnation.

Normally, the air temperature decreases with increasing elevation above the ground surface. When the temperature instead increases with elevation, a condition known as a temperature inversion exists. Southern California frequently experiences temperature inversions which inhibit pollutant dispersal. Inversions may be either ground-based or elevated. Ground-based inversions are most severe during clear, cold early winter mornings. At this time, the greatest pollution problems are from carbon monoxide (CO) and nitrogen oxides (NOx). High CO concentrations can occur on winter days with strong surface inversions and light winds. CO transport is extremely limited during these conditions, and the highest CO concentrations occur in close proximity to the source of emissions. Because CO is produced almost entirely from automobiles, the highest CO concentrations are associated with areas of heavy traffic and congestion.

Elevated inversions act as a lid or upper boundary and restrict vertical mixing. Mixing heights for elevated inversions are lower and more persistent in the summer. Low summer inversions are partly responsible for the high levels of ozone (O_3) experienced during the summer months.

During summer's longer daylight hours, abundant sunshine provides sufficient energy to fuel the photochemical reactions between NOx and reactive organic compounds (ROC) which form ozone. To form high levels of ozone, there must be ample sunlight, early morning stagnation in source areas, high surface temperatures, strong and low morning inversions, greatly restricted vertical mixing during the day and daytime subsidence that strengthens the inversion layer. The most frequent ozone transport route is from source areas in coastal areas to receptor areas along the base of the San Gabriel and San Bernardino Mountains. On the rare days with offshore flows, ozone transport is more limited, and the highest ozone concentrations occur in the western part of the SCAB.

High nitrogen dioxide (NO_2) levels usually occur during the autumn or winter on days with summer-like weather conditions, including low inversions, limited daytime mixing and stagnant windflows. Although days are clear, sunlight is limited in duration and intensity, and the photochemical reactions that would otherwise form ozone are incomplete.

Atmospheric particulates are made up of fine solids or liquids, such as soot, dust, aerosols, fumes and mists. Many of the total suspended particulates (TSP) in the atmosphere are less than ten microns in diameter. These fine particles are referred to as PM10. As with ozone, a substantial fraction of PM10 forms in the atmosphere as a result of chemical reactions. Peak concentrations of both ozone and PM10 occur downwind of the origin or precursor emission sources.

3.2.2 LOCAL

The SOCTIIP study area can roughly be defined as follows. The northern boundary would include where Interstate 405 (I-405) merges with Interstate 5 (I-5). The southern boundary would extend into San Diego County just south of the Basilone Road exit for the I-5. The western boundary parallels I-5 and extends several miles to the west of I-5. The eastern boundary extends several miles east of the alignment of the Far East Corridor. The study area is influenced by the marine microclimate zone and is subject to coastal clouds or fog on spring and summer days, particularly the areas closer to the coast. Because of this marine influence, winter temperatures are warmer and summer temperatures are cooler than in inland areas of Orange County. In these inland areas, summers are warmer than along the coast, but cooler than in areas of the SCAB in Riverside and San Bernardino Counties. The nearest locations to the SOCTIIP area for which the South Coast Air Quality Management District (SCAQMD) has annual temperature data are in El Toro and Laguna Beach. For El Toro, the average mean temperature is 17˚C (62˚F); for Laguna Beach, it is 16˚C (61˚F). There are daily and seasonal variations. Occasionally, temperatures in the SOCTIIP area have exceeded 37˚C (100˚F) or dipped below freezing.

Winds in the project area are driven by the land/sea breeze circulation system. Wind patterns are dominated by daytime on-shore sea breezes. At night, the wind generally slows and reverses direction, traveling towards the sea. One other important wind regime occurs when a high pressure center forms over the western United States and creates Santa Ana winds that blow from the northeast and east across Orange County to the ocean.

In summer, the Santa Ana River canyon (i.e., generally the area along State Route 91 that connects Orange County with Riverside County) is the major ozone transport route from Orange County into Riverside and San Bernardino Counties. Pollutants originating in Orange County are transported by the daytime on-shore sea breezes inland, where they react to form ozone in these inland counties, some distance from where the primary pollutants are emitted in Orange County.

3.3 AIR QUALITY MANAGEMENT

Air quality in the South Coast Air Basin (SCAB) and San Diego Air Basin (SDAB) is regulated by federal, state and regional control authorities as described in the following sections.

3.3.1 FEDERAL

The United States Environmental Protection Agency (EPA) has overall responsibility for insuring that the nation meets the national ambient air quality standards (NAAQS). EPA Region IX, headquartered in San Francisco, covers all of California. The EPA has oversight authority over state and local air quality planning and regulatory actions through requirements set forth in the federal Clean Air Act (CAA), as amended in 1990 (42 U.S.C. section7401 et. seq.).

Title I of the 1990 CAA Amendments specifies procedures and timetables for attaining national ambient air quality standards for six criteria pollutants: ozone (O_3), carbon monoxide (CO), fine or respirable particulate matter (PM10), nitrogen dioxide (NO_2), sulfur dioxide (SO_2) and lead (Pb). The federal standards, which the CAA directs the EPA to set at levels to protect public health with an adequate margin of safety, are presented in Table 3-1.

In 1997, the EPA proposed an 8-hour standard for ozone and standards for particulate matter less than 2.5 microns in diameter (PM2.5). In 1999, a federal court ruling (American Trucking Associations, Inc., et al., v. United States Environmental Protection Agency) blocked implementation of these standards. In February 2001, the United States Supreme Court upheld the standards but remanded some issues back to the Circuit Court. In March 2002, the Circuit Court upheld the standards. The California Air Resources Board has recommended to the EPA that the South Coast and San Diego Air Basins be listed as nonattainment for the new 8-hour ozone standard.

Establishment of a PM2.5 standard was just the first step in the assessment and reduction of PM2.5 levels. Tools need to be developed to accurately estimate PM2.5 and precursor emissions, their dispersion and atmospheric interactions, and the resulting concentrations. Uncertainty brought by the court challenge delayed development of the tools to estimate PM2.5 emissions and concentrations, especially at a project level. The focus at this time is establishment of a PM2.5 measurement network to determine which areas are in attainment of the standard and which are not and how substantial the concentrations are in areas of nonattainment. At this time, adequate tools are not available to perform a detailed assessment of PM2.5 emissions and impacts at the project level. Further, there are no good sources for the significance thresholds for PM2.5 emissions. Until tools and methodologies are developed to assess the impacts of projects on PM2.5 concentrations the analysis of PM10 will need to be used as an indicator of potential PM2.5 impacts.

On June 20, 2002, the CARB approved staff's recommendation to revise the PM10 annual average standard to 20 $\mu g/m^3$ and to establish an annual average standard for PM2.5 of 12 $\mu g/m^3$. These standards will take effect upon final approval by the Office of Administrative Law, which is expected in May 2003.

TABLE 3-1
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Air Pollutant	State Standards	Federal Standards	
		Primary	Secondary
Ozone	0.09 ppm, 1-hr avg. --	0.12 ppm, 1-hr. avg. 0.08 ppm (157 µg/m$^{3)}$	0.12 ppm, 1-hr avg. 0.08 ppm (157 µg/m$^{3)}$
Carbon Monoxide	9.0 ppm, 8-hr. avg. 20 ppm, 1-hr. avg.	9 ppm, 8-hr. avg. 35 ppm, 1-hr. avg.	None
Nitrogen Dioxide	0.25 ppm, 1-hr. avg.	0.053 ppm, annual arithmetic mean	0.053 ppm, annual arithmetic mean
Sulfur Dioxide	0.25 ppm, 1-hr 0.04 ppm, 24-hr avg.	0.030 ppm, annual arithmetic mean 0.14 ppm, 24-hr. avg.	0.50 ppm, 3-hr. avg.
Respirable Particulate Matter (PM10)	50 µg/m^3, 24-hr. avg. 20 µg/m^3 annual geometric mean	150 µg/m^3, 24-hr avg. 50 µg/m^3 annual arithmetic mean	150 µg/m^3, 24-hr avg. 50 µg/m^3 annual arithmetic mean
Fine Particulate Matter (PM2.5)	No separate state standard 12 µg/m^3 annual arithmetic mean	65 µg/m^3, 24-hr avg. 15 µg/m^3 annual arithmetic mean	65 µg/m^3, 24-hr avg. 15 µg/m^3 annual arithmetic mean
Sulfates	25 µg/m^3, 24-hr avg.	None	None
Lead	1.5 µg/m^3, monthly avg.	1.5 µg/m^3, calendar quarter	1.5 µg/m^3, calendar quarter
Hydrogen Sulfide	0.03 ppm, 1-hr avg.	None	None
Visibility-Reducing Particles	In sufficient amount to reduce prevailing visibility to less than 10 miles at relative humidity less than 70%, 1 observation	None	None

Notes:
ppm - parts per million
µg/m^3 - micrograms per cubic meter
hr - hour
avg - average

Source: California Air Resources Board, (1/25/99).

The 1990 CAA Amendments divided the nation into five planning classifications, depending on the severity of ozone pollution, and set new timetables for attaining the NAAQS. The five ozone categories range from marginal to extreme. The SOCTIIP alternatives are in both the South Coast Air Basin, which is the nation's only extreme ozone nonattainment area, and the San Diego Air Basin, which is in attainment. Attainment deadlines are from three to twenty years, depending on the classification. EPA determines whether plans submitted by the states meet CAA requirements or must be sent back for revision.

The air quality provisions of the CAA as amended, the transportation planning provisions of 23 CFR section 771 et seq., and Title 49 of the United States Code (Transportation), are intended to ensure that integrated transportation and air quality planning occur in areas designated by the EPA as nonattainment or maintenance areas. On November 24, 1993, the EPA published criteria in the Federal Register (58 F.R. 62235; 40 CFR Part 93) for implementing CAA conformity requirements for both general development and transportation projects. According to the CAA, transportation plans, programs and projects cannot: (1) create new violations of the federal air quality standards, (2) increase the frequency or severity of existing violations of the standards or (3) delay attainment of standards.

EPA has designated SCAB as extreme non-attainment for 1-hour ozone, and serious non-attainment for PM10 and CO. The SCAB has not had more than one violation of the federal CO standard in the past two years. Therefore, the SCAB has met the criteria for CO attainment. However, SCAB is still formally designated as a non-attainment area for CO until USEPA redesignates it as an attainment area. SCAQMD plans to submit a proposed maintenance plan to the USEPA in late fall/early winter 2003.

SDAB is designated as serious non-attainment for ozone while CO is redesignated as attainment. PM10 for SDAB was not designated.

The attainment status for both SCAB and SDAB are summarized in Table 3-2.

Table 3-2
Attainment Status for SCAB and SDAB

Area	Pollutant	Federal Designation	State Designation
SCAB	Ozone	Extreme non-attainment	Extreme non-attainment
	CO	Serious non-attainment[1]	Serious non-attainment
	PM-10	Serious non-attainment	Serious non-attainment
	NO_2	Attainment	Attainment
	SOx	Attainment/Maintenance	Attainment/Maintenance
SDAB	Ozone	Attainment/Maintenance	Serious non-attainment
	CO	Attainment/Maintenance	Attainment/Maintenance
	PM-10	Unclassifiable	Non-attainment
	NO_x and SOx	Attainment/Maintenance	Attainment/Maintenance

Sources: California Air Resource Board (6/03)
San Diego Air Pollution Control District (1/02)

Notes: 1. SCAB has met the criteria for CO attainment, but has not yet been redesignated as an attainment area by EPA.

EPA is scheduled to promulgate air quality designations for the new 8-hour ozone standard by April 15, 2004. At this time, it is not known when EPA plans to begin implementation of the new PM2.5 standards. Although no formal status has been issued, monitoring data indicate that the 8-hour ozone standard is exceeded in both SCAB and SDAB. Additionally, both the state and federal PM2.5 criteria are exceeded in the area.

3.3.2 CALIFORNIA

The California Air Resources Board (CARB), a department of the California Environmental Protection Agency (CalEPA), has responsibility for regulating mobile sources of pollution (including automobiles and trucks), preparing the State Implementation Plan (SIP) on the basis of locally prepared plans, and serving in an oversight capacity over all regional and county air pollution control districts in California. The CARB is governed by six members, chosen by the governor on the basis of qualifications specified in the State Health and Safety Code, and five members who are board members of regional and county air districts.

Through requirements of California Clean Air Act (CCAA), codified as Chapter 10 of Division 26 of the Health and Safety Code (Health and Safety Code 40910), all air districts in the state must endeavor to achieve and maintain state AAQS for ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide by the earliest practicable date. This goal does not apply to the state PM10 standard. California's AAQS are generally stricter than the federal standards for the same pollutants. California has also established state standards for sulfates, hydrogen sulfide, vinyl chloride, PM2.5, and visibility-reducing particles. The California AAQS are also shown in Table 3-1.

The CCAA divides ozone nonattainment areas into four categories; moderate, serious, severe and extreme; to which progressively more stringent requirements apply. State designations for the two air basins traversed by the SOCTIIP alternatives are the same as the federal designations: extreme and serious. The CARB periodically revises the attainment status of each air basin, depending on progress in achieving state standards. The attainment status of the state standards was presented on the previous page in Section 3.3.1.

3.3.3 REGIONAL

All air districts in California are regulated through the California Health and Safety Code in Division 26 (Health and Safety Code Section 39000 et seq.), which sets forth their general powers and duties. Air quality planning requirements for all districts are contained in Chapter 10 of the above reference document. The two districts with jurisdiction over the areas traversed by the SOCTIIP alternatives are the South Coast Air Quality Management District (SCAQMD), which includes Orange County, and the San Diego County Air Pollution Control District (SDAPCD).

3.3.3.1 South Coast Air Quality Management District

The SCAQMD is a regional district, created through the Lewis-Presley Air Quality Management Act, which is codified as Chapter 5.5 of the State Health and Safety Code (Health and Safety Code Section 40400 et seq.). Chapter 5.5 identifies specific requirements applicable to the SCAQMD. The SCAQMD is governed by a twelve member Board comprised of supervisors from Los Angeles, Orange, San Bernardino and Riverside Counties, city representatives from the four counties, and three members appointed by the governor, State Senate Rules Committee and the Speaker of the Assembly, respectively. The SCAQMD has primary responsibility for monitoring air quality, planning for air quality attainment, and regulating sources of air pollution within its jurisdiction. Although the SCAQMD has some authority to regulate motor vehicle use, it is not allowed to control direct emissions from motor vehicles.

The SCAQMD's primary area of concern is the SCAB. The SCAB includes all of Orange County and the non-desert parts of Los Angeles, Riverside and San Bernardino Counties. The SCAB has been designated by the EPA as a non-attainment area for ozone, carbon monoxide, and PM10. The SCAB has met the federal standards for nitrogen dioxide for the third year in a row, and has been redesignated as attainment. Attainment of all federal PM10 health standards is to be achieved by December 31, 2006, and ozone standards are to be achieved by November 15, 2010. However, the attainment date for 8-hour ozone has not been set. For CO, the deadline was December 31, 2000. Three days during 2000 exceeded the federal CO standard. The EPA gave SCAQMD a two year extension period to reach the CO attainment goal to December 31, 2002. The federal and state standards for CO were met at the end of 2002.

In areas that are not achieving the NAAQS, the CAA requires that plans be developed and implemented to meet the NAAQS. The EPA oversees the efforts in the SCAB and insures that appropriate plans are being developed and implemented. The primary agencies writing the Air Quality Management Plan (AQMP) are the Southern California Association of Governments (SCAG) and the SCAQMD. SCAG prepares the transportation component of the AQMP.

SCAQMD and SCAG, in coordination with local governments and the private sector, have developed the AQMP for the SCAB. The AQMP is the most important air management document for the SCAB because it provides the blueprint for meeting the state and federal AAQS. The 1997 AQMP was approved locally on November 8, 1996, by the governing board of the SCAQMD. The CARB amended the ozone part of the 1997 AQMP in 1999 as part of the California SIP. The EPA approved the 1997 AQMP with the 1999 Amendments in December 1999. State law mandates the revision of the AQMP at least every three years, and federal law specifies certain dates for developing attainment plans for criteria pollutants. The 1997 AQMP with the 1999 Amendments replaces the 1994 AQMP. The 1997 revision to the AQMP was approved in response to the requirements set forth in the CCAA and the 1990 amendments to the federal CAA. SCAQMD and SCAG have prepared a 2003 AQMP, and have adopted it. Subsequently it was reviewed and approved by CARB, and now is under review by the EPA.

The overall control strategy for the AQMP is to meet applicable state and federal requirements and to demonstrate attainment with the AAQS. The 1997 AQMP uses two tiers of emission reduction measures: (1) short and intermediate term measures, and (2) long term measures.

Short and intermediate term measures propose the application of available technologies and management practices between 1994 and 2005. These measures rely on known technologies and proposed actions to be taken by several agencies that currently have statutory authority to implement such measures. Short and intermediate term measures in the 1997 AQMP include 35 stationary source, seven on-road, six off-road, one transportation control and indirect source, five advanced transportation technology and one further study measures. All these measures are proposed to be implemented between 1995 and 2005. These measures rely on both traditional command and control and on alternative approaches to implement technological solutions and control measures.

To ultimately achieve the AAQS, additional emission reductions will be necessary beyond the implementation of these short and intermediate term measures. Long term measures rely on the advancement of technologies and control methods that can reasonably be expected to occur between 1997 and 2010. These long term measures rely on further development and refinement of known low and zero emission control technologies for both mobile and stationary sources, along with technological breakthroughs.

The "Draft 2003 Air Quality Management Plan" (Draft 2003 AQMP) was released in early 2003 and was adopted locally August 1, 2003. The California Clean Air Act requires a non-attainment area to update its AQMP triennially to incorporate the most recent available technical information. In addition, 40 CFR Part 93 requires that the latest planning assumptions are used in all transportation conformity determinations. The CARB and SCAB elected to update the mobile source emissions budgets contained in the SIPs to maintain consistency with the latest planning assumptions that will be used in future conformity determinations. Since the 1997 AQMP and 1999 amendments, updated demographic data has become available, new air quality episodes have been identified, and the science of estimating motor vehicle emissions and air quality modeling techniques for ozone and PM10 have improved. Therefore, a plan update is necessary to ensure continued progress toward attainment to avoid a transportation conformity lapse.

The Draft 2003 AQMP addresses all criteria pollutants, including PM10, ozone, and CO. Toxic air contaminants are not addressed in the plan. The Draft 2003 AQMP includes improved emission inventories, updated motor vehicle emission budgets for transportation conformity purposes, and an update to the attainment demonstration for PM10, ozone, and CO. The overall control strategy is comprised of the District's Stationary and Mobile Source Control Measures, CARB's Proposed 2003 State and Federal Strategy for the California State Implementation Plan (SIP), and SCAG's Transportation Control Measures.

The SCAQMD, on August 1, 2003, adopted the 2003 AQMP. The Draft 2003 AQMP was reviewed and approved by CARB on October 24, 2003. It now goes to the U.S. EPA for their review and possible approval. No schedule has been announced U.S. EPA review as of this writing (December 2003).

3.3.3.2 San Diego County Air Pollution Control District

The San Diego County Air Pollution Control District (SDAPCD) has responsibility for air quality control throughout San Diego County. It is a county special district, governed by the Board of Supervisors and representatives of cities throughout the County.

San Diego County is a serious non-attainment area for the state and is attainment for the federal ozone NAAQS.

As in the SCAB, the CCAA directs state-required air quality planning in San Diego County. The SDAPCD and the San Diego Association of Governments (SANDAG), which prepare the attainment plans required by the state and the CAA, share agency responsibility for air quality planning in San Diego County.

The most recent update to the State Implementation Plan for San Diego County was released by the SDAPCD in April 1998. The plan, prepared by the SDAPCD, is simply an update of their stationary source control measures. More recent air planning documents for the San Diego air basin include "The San Diego Air Basin Triennial Regional Air Quality Strategy Revision" (SDAPCD, August 2001), and the "Ozone Redesignation Request and Maintenance Plan for San Diego County," (SDAPCD, December 2002).

San Diego County has not attained the state ozone standard, and as such, is required by the California Clean Air Act to prepare the Regional Air Quality Strategy Revision (RAQS). The RAQS identifies emission control strategies to provide expeditious progress toward attaining the state ozone standard. The 2001 RAQS only proposed the adoption of one additional control measure which would require add-on control equipment for degassing of above-ground gasoline storage tanks at bulk plants and bulk terminals during cleaning, repairing, or decommissioning operations.

In 1999, San Diego County did not have any exceedances of the national ozone standard for the first time in their monitoring history. The County has continued to not exceed the ozone standard in subsequent years. Therefore, in 2002 the SDAPCD filed the redesignation request with the CARB and subsequently the U.S. EPA to change their designation from a "serious ozone nonattainment area" to an attainment area. The redesignation request documents the steadily declining ozone concentrations in the County, references the stationary source controls imposed by the County, and provides emission inventories for past, current and future years for ozone precursors (i.e., VOC and NOx). On June 26, 2003, the U.S. EPA published the redesignation of San Diego County to attainment for the 1-hour ozone national standard in the Federal Register. The EPA at that time also approved the maintenance plan and emission budgets contained in the redesignation request.

3.4 HEALTH EFFECTS AND SENSITIVE RECEPTORS

Basic knowledge of air pollutants and a general knowledge of pollutants will aid the reader in understanding the technical nature of this report. This section provides general information concerning each of the major air pollutants: what they are, how they are generated and how they affect human health and activities.

Many pollutants are released directly into the atmosphere by motor vehicles and aircraft, among numerous other sources. This means that the pollutant is created and emitted immediately. Pollutants that are directly emitted by a source into the atmosphere are called primary pollutants. An example of a primary pollutant is carbon monoxide (CO). Other pollutants require additional chemical reactions subsequent to their release into the atmosphere. Pollutants, which are formed via chemical reactions in the atmosphere, are referred to as secondary pollutants. The most important secondary pollutant is ozone. This section discusses the major pollutants of concern in the SOCTIIP study area and provides information regarding the health and well-being impacts of each pollutant.

3.4.1 OZONE (O_3)

Ozone is not directly emitted by any pollutant source, and therefore, is considered a secondary pollutant. It is the product of a reaction in the atmosphere between hydrocarbons (HC) and nitrogen oxides (NOx). This reaction takes place only in the presence of ultraviolet light. Sunlight contains a lot of ultraviolet light. This is why ozone levels are the highest on bright, sunny days. As it takes several hours for the ozone levels to build, the pollutant is diffused over a wide area and concentrations are fairly constant over a regional area.

Ozone is a strong irritant to the respiratory system. It primarily affects children, people with respiratory ailments and the elderly, but has the potential to affect others as well. Exposure of humans to high concentrations of ozone may result in eye irritation, nausea, dizziness, headaches, coughs or a burning sensation in the chest, even in healthy people. Ozone aggravates heart disease, asthma, bronchitis and emphysema, and also acts to reduce lung capacity over long exposure periods. Research into the effects of this pollutant shows that ozone damages the alveoli, which are the small sacs in the lung where the exchange of gases between air and blood takes place.

3.4.2 CARBON MONOXIDE (CO)

The primary source of CO is the internal combustion engine in motor vehicles. CO is a primary pollutant. Generally, CO is a localized pollutant and high concentrations of CO generally occur only adjacent to very busy and congested roads. The highest concentrations occur when the atmosphere is very stable and there is very little or no wind. These conditions occur most commonly during early morning winter hours.

In the lung, particular gases are exchanged between the air and blood. The blood releases carbon dioxide (CO2), which is a waste product of the body, into the alveoli, from which the CO2 is then exhaled. Also in the alveoli, inhaled oxygen is absorbed by the blood and then carried to the parts of the body where it is needed. Because of the chemical nature of the substances, hemoglobin (the protein in the blood that carries oxygen) bonds more easily to CO than to oxygen. This means that the blood is more likely to absorb any CO that is present in the air that is inhaled than it is to absorb oxygen in the air. As a result, CO reduces the amount of oxygen that is absorbed by the blood and, in turn, reduces the amount of oxygen which reaches the heart, brain and other body tissues. The effects of this phenomenon, even at low doses, include headaches, fatigue and slow reflexes from lack of oxygen. Exposure to CO particularly endangers people with coronary artery disease, whose hearts already receive limited supplies of blood and oxygen. A consistent association between increasing ambient CO levels and excess admissions for heart diseases, such as congestive heart failure, is observed in many cities across the United States.

3.4.3 RESPIRABLE PARTICULATE MATTER (PM10 and PM2.5)

Particulate matter consists of microscopic material in the air. It is made of fine dust produced by friction and grinding processes of soil, rocks or metals, smoke and emissions from combustion processes and use of certain consumer products. In rural areas, wind and agricultural operations are primarily responsible for the particulate level. In urban areas, transportation sources can be a major source of particulate matter, especially PM10 and PM2.5. Industrial activity and the burning of wood are other sources. Particulates can also be formed in the atmosphere via chemical reactions. They are formed in the atmosphere by reactions from precursor gases. The most important of these gases are SO2, NO2, VOC and ammonia. PM10 and PM2.5 scatter light and significantly reduce visibility. Suspended water droplets (e.g., fog) can be a microscopic location where chemicals collect and chemically react. Then, as the water vaporizes, the remaining chemicals can form a particulate. PM10 and PM2.5 are emitted directly from combustion sources or can form in the atmosphere and are naturally occurring. Therefore, it is both a primary and secondary pollutant. The human body has the ability to prevent most large particles that might be inhaled from reaching the lungs. Larger particles are trapped in the nose, throat and upper respiratory system. Smaller particles (particles smaller than 10 microns in diameter, referred to as PM10), however, are able to bypass the body's protection mechanisms and can reach areas deep inside the lung. Such small particles can contain substances that can irritate the lung, constrict airways and aggravate chronic heart disease.

The Transportation Conformity Rule requires that transportation plans, programs and projects conform to the purpose of the State Implementation Plan in air quality nonattainment and maintenance areas. As of yet, EPA has not designated nonattainment areas for $PM_{2.5}$. Section 305 of the National Highway System Designation Act of 1995 specifically amended the Clean Air Act limiting the applicability of the transportation conformity provisions to nonattainment and maintenance areas (FHWA Letter from John T. Price, FHWA to Joanne Spalding, Sierra Club, titled "Supplemental EIS for US-95 in Las Vegas," dated February 5, 2002). The Transportation Conformity Rule and court rulings are clear that the conformity requirements do not apply in areas that have not been designated as nonattainment areas for specific pollutants.

EPA has determined the health effects of fine particulates and has set the $PM_{2.5}$ standard to ensure that the public health is protected. Many areas of the country are in the process of monitoring levels of $PM_{2.5}$, and this monitoring will serve as the basis for whether this pollutant needs to be addressed at the regional scale, local scale or both. The FHWA believes the effect of $PM_{2.5}$ at a project level cannot be determined at this time and it may be very similar to ozone in that it is a regional effect, not a localized effect.

Based on the uncertainties with the existing and reasonably obtainable scientific information, as summarized above, and considering the purposes of the project, a project-specific analysis addressing $PM_{2.5}$ would not further the purposes of NEPA (40 CFR § 1502.9(c)(2)). (More background on particulates and how they are related to air toxics, including future control measures, are presented in Sections 3.4.8 and 5.3.1.)

3.4.4 NITROGEN OXIDES (NO_X)

Nitrogen oxides consist primarily of nitrogen oxide (NO) and nitrogen dioxide (NO_2). The most substantial impact of NOx emissions is its contribution to the formation of ozone, as discussed earlier. NO_2, by itself, however, damages the cells lining the respiratory tract and increases susceptibility to respiratory infection. It also constricts the airways of asthmatics. Most combustion processes, including motor vehicles, emit a combination of NO and NO_2. Much of the NO further reacts with oxygen in the atmosphere to form NO_2. The SCAB has not exceeded the federal standard for NO_2 since 1991. Although the health criteria for NO_2 have been met for almost a decade, NOx emissions are still a major concern because higher emissions of NOx result in higher concentrations of ozone.

3.4.5 SULFUR DIOXIDE (SO_2)

Since sulfur was removed from gasoline, motor vehicles have contributed very little to the SO_2 emissions. SO_2 is a regional pollutant and concentrations in the SCAB are well below the AAQS. The more stringent state 1-hour standard was last exceeded in 1990, due to a breakdown at a local refinery. This was the first exceedance since 1984. The presence of SO_2 in the atmosphere has been associated with a variety of respiratory diseases and constricts airway passages, thereby increasing airway resistance. Industrial sources, such as paper mills, power plants and smelters, are the major sources of this pollutant.

3.4.6 LEAD (PB)

Lead is introduced into the atmosphere in automobile emissions (although in far smaller concentrations than in the 1970's), in emissions from industries that smelt or process the metal, and other industrial and combustion processes. Lead is a regional pollutant. The last exceedance of the federal NAAQS was in 1994. Exposure of lead to children one to five years old is extremely dangerous. Exposure can impair the formation of the nervous system and can damage kidneys and blood-forming systems. Lead exposure in other age groups is also considered hazardous.

3.4.7 HYDROCARBONS (HC)

While there are no health effects linked directly with HC, it is important as a pollutant because it reacts with NOx in the presence of sunlight to form ozone. There are no state or federal standards for HC emissions. Hydrocarbons are also referred to as total organic gases (TOG). The methane portion of hydrocarbon gases does not contribute substantially to the formation of ozone and, therefore, references to non-methane hydrocarbons (NMHC), reactive hydrocarbons (RHC) and reactive organic gases (ROG) are also found in the literature, and are often used interchangeably.

3.4.8 TOXIC AIR CONTAMINANTS

In addition to the "traditional" air pollutants, such as ozone and particulate matter, air toxics may also be a concern. There are no standards set for air toxics at this time. However, it is believed that toxic air contaminants (TACs) may cause serious, long-term effects, such as cancer, even at low levels. The California Air Resources Board has identified about 200 pollutants as air toxics, and measures continue to be adopted to reduce emissions of air toxics.

Motor vehicles and other mobile sources are the predominant source of cancer-causing TACs. These findings are outlined in SCAQMD's Multiple Air Toxics Exposure Study II (MATES II). MATES II included a ground-breaking effort by SCAQMD to analyze the cancer risk from exposure to diesel particulate, or soot, which the CARB in 1998 listed as a carcinogenic air pollutant. Diesel particulate is emitted by diesel-fueled trucks, buses, trains, ships, tugboats, construction equipment, power generators and stationary engines used throughout the region for tasks such as pumping water. Toxic air pollutants consist of a variety of compounds, including metals, minerals, soot and hydrocarbon-based materials.

MATES II study covered the entire SCAB plus the Coachella Valley. Overall, the study showed that motor vehicles and other mobile sources accounted for about 90% of the cancer risk, while industries and other stationary sources accounted for about 10%. The monitoring toxic data accompanied by a computer modeling study show that the highest risk is in the urban areas where there is heavy traffic and high concentrations of population and industry.

The California Air Resources Board (CARB) has found that diesel particulate matter (DPM) poses the greatest cancer risks among all identified air toxics. Diesel trucks contribute more than half of the total DPM emissions, with the remainder coming from stationary and other diesel combustion sources. However, the CARB has adopted a Diesel Risk Reduction Plan (DRRP) with control measures that would reduce the overall DPM emissions by about 85% from 2000 to 2020. In addition, total toxic risk from diesel PM is a function of lifetime exposure, and most sensitive receptors of diesel exhaust may only be exposed for a much shorter duration. Further, DPM is only one of many environmental toxics, and its cancer risks may be overshadowed by those of other toxics and other pollutants in various environmental media. Thus, while diesel exhaust may pose potential cancer risks, most receptors' are not exposed to a high level throughout their lifetime reducing the risk, and these risks would also greatly diminish in the future operating years of the project due to planned emission control regulations.

The FHWA has reviewed the MATES-II study to determine the suitability of transferring the results of the MATES-II study to environmental assessments (Memo from James M. Shrouds, FHWA to William H. Kappus, EPA, titled "Follow-up to 2/4/02 Memorandum on Project-Level Analysis of Air Toxic and PM2.5 Emissions, dated April 3, 2003). The FHWA recognized that the MATES-II study pointed to a 70 percent excess cancer risk attributed to DPM alone – 89 percent for all mobile source air toxics, collectively. Despite these high numbers, the FHWA stressed that there is great uncertainty surrounding the establishment of risk factors. The FHWA further points out that the EPA has not developed a risk factor for DPM claiming instead that the data for human exposure are too uncertain to generate such a benchmark. For regional air toxic levels, the MATES-II research findings provided a positive assessment and outlook for the future. Between 1990 and 1997, cancer rates associated with air toxics decreased by about 50 percent. In addition, as EPA's Tier II and heavy-duty vehicle emission standards along with low-sulfur fuel standards go into effect, air toxics are projected to drop even further – 95 percent in DPM by 2020.

3.4.9 SENSITIVE RECEPTORS

Receptors sensitive to air pollution occur in all areas with a human presence. Residential, school and hospital areas are often considered to be the most sensitive areas due to the presence of children and the infirmed. However, people sensitive to air pollution also are located in office developments, industrial areas and all through developed areas. Figure 3-1 shows the areas of sensitive receptors in the developed areas in south Orange County. There are developed areas continuously along I-5 throughout the SOCTIIP study area. The land uses along I-5 include residences, schools, commercial centers, office complexes and other urban and suburban uses.

The Arterial Improvement Only and the Arterial Improvement Plus HOV Lanes Alternatives would widen Antonio Parkway/Avenida La Pata, and implement Transportation Management Improvements on segments of Ortega Highway, Camino Las Ramblas and Avenida Pico. Development is present (or under construction) along roughly half of the Antonio Parkway/Avenida La Pata alignment of these two alternatives. The vast majority of development in this area is residential. Development, mostly residential, is also present along most of Ortega Highway, Camino Las Ramblas and Avenida Pico.

All the SOCTIIP corridor alternatives begin at the southern terminus of the existing Foothill Transportation Corridor (FTC). Tesoro High School is just south of Oso Parkway and immediately west of the corridor. This High School opened in fall 2001.

The Central Corridor alignments lay further east than Antonio Parkway/Avenida La Pata. These alignments travel along the westerly edge of the Talega Planned Community (PC), east of San Clemente. Residences are under construction in the Talega PC that will be near the Central Corridor alignments. The Central Corridor would turn to the southwest and travel near Avenida Pico, and this area is developed with a mixture of residences, commercial uses and schools.

The Alignment 7 Corridor (A7C) has similar proximity to developed areas as does the Central Corridor Alternatives. The northern portion of A7C is not adjacent to developed areas, except for the extreme northern end which is next to the high school. A7C passes through the Talega PC and parallels Avenida Pico.

The Far East Corridor (FEC) alignment traverses portions of undeveloped, privately owned land east of San Juan Capistrano and San Clemente, and portions of Marine Corps Base Camp Pendleton. At the extreme northern end, it is adjacent to the Tesoro High School. It passes along the eastern edge of the Talega PC. At the junction with I-5, this alignment would also pass near Marine Corps housing.

Schools are an especially sensitive receptor site due to the young age of the students and the high level of activity that can occur on the playfields. Schools within 0.4 km (0.25 mi) of the centerlines of the SOCTIIP build alternatives are listed in Table 3-3.

Table 3-3
Schools Within 0.25 Mile (0.4 Km) of Centerlines of Build Alternatives

City of San Clemente	City of Mission Viejo
Ole Hanson Elementary School 189 Avenida La Cuesta	Mission Viejo High School 25025 Chrisanta Drive
San Clemente High School 700 Avenida Pico	Capistrano Valley High School 26301 Via Escolar
Concordia Elementary School 3120 Avenida del Presidente	Linda Vista Elementary School 25222 Pericia Drive
Shorecliffs Middle School 240 Via Socorro	La Tierra Elementary School 24150 Lindley
City of San Juan Capistrano	Unincorporated Orange County
San Juan Elementary School 31642 El Camino Real	Tesoro High School 29758 Oso Parkway
Serra High School 31431 El Camino Real	Las Flores Elementary School 25862 Antonio Parkway
City of Dana Point	
Palisades Elementary School 26462 Via Sacramento	

3.5 MONITORED AIR QUALITY

3.5.1 OVERVIEW OF REGIONS

The four pollutants of greatest concern in the SCAB, and to a much lesser extent, the San Diego County Air Basin, are O_3, NOx, CO and PM10. To determine the status of air quality within their respective jurisdictions, air districts monitor air contaminants and compare contaminant levels in samples to the federal and state AAQS listed earlier in Table 3-1.

3.5.1.1 South Coast Air Basin

The SCAQMD samples ambient air at monitoring stations throughout the SCAB. There are two monitoring sites in south Orange County: one in Costa Mesa and one in El Toro. The locations of the air quality monitoring stations in SCAB are shown in Figure 3-2. Monitored ozone levels exceed both the federal and state AAQS throughout the SCAB, however, O_3 levels have been dropping in recent years and 1999 was the cleanest year on record. However, the SCAB still exceeds the federal standard more frequently than any other area in the United States, and also records the highest peak readings. It is the nation's only extreme O_3 non-attainment area. As such, it is not required to attain the federal ozone standard until 2010, three years later than the most impacted areas in the severe category. O_3 levels have dropped dramatically over the years. In 1980, the maximum O_3 concentration (1 hour) measured in Orange County was 0.340 parts per million (ppm). That level has steadily dropped, and in 1999 the maximum O_3 concentration in Orange County was 0.116 ppm.

The federal and state 8-hour AAQS for CO are still exceeded a few days each year in the SCAB. The exceedances generally occur in the Los Angeles area. Neither the state nor federal CO AAQS have been exceeded in Orange County since 1992 CO is produced almost entirely by automobiles.

The SCAB has be redesignated as attainment for NO_2. The pollutant levels of NO_2 are below both the state and federal AAQS.

PM10 levels regularly exceed the federal NAAQS in Los Angeles, Riverside and San Bernardino Counties. Since 1988 when PM10 monitoring was initiated in Orange County, the AAQS was only exceeded in Orange County in 1990 and 1995. The more stringent state PM10 AAQS is exceeded in all four Counties. The number of days exceeding the state PM10 AAQS varies from year to year. However, the levels of PM10 have not shown a clear upward or downward trend.

SO_2 and lead levels in all areas of the SCAB are substantially below federal and state AAQS limits.

3.5.1.2 San Diego Air Basin

The San Diego Air Basin, which includes all of San Diego County, is designated non-attainment for the state O_3 and the state PM10 AAQS. The San Diego Air Basin is an attainment area or unclassified for all other state and federal standards.

The CARB has determined that the O_3 in the San Diego Air Basin is largely transported from the SCAB. San Diego County's air quality did not exceed the federal 1-hour ozone NAAQS in 1999 and in subsequent years, and the area has been reclassified as attainment for the O_3 NAAQS.

The federal PM10 NAAQS have only been exceeded in San Diego County in two years since 1988. Specifically, the 24-hour NAAQS was exceeded in 1993, and the annual NAAQS was exceeded in 1994.

3.5.2 DISTRICT MONITORING STATIONS

The proposed SOCTIIP alternatives are primarily in SCAQMD Source Receptor Area 21 (Capistrano Valley). Because the SCAQMD does not maintain an air monitoring station in Area 21, the SCAQMD includes Area 21 in air quality forecasts for Source Receptor Area 19, which is monitored at the El Toro monitoring station. Note that the El Toro monitoring station was relocated to Mission Viejo in 2000.

The nearest monitoring station to the southern terminus of the Far East Corridor alignments is at 1701 Mission Avenue in the City of Oceanside in northern San Diego County. It is operated by the San Diego County Air Pollution Control District. Air quality readings from the El Toro station from 1998 through 2002 are presented in Table 3-4. Air quality readings from the Oceanside station from 1997 through 2001 (2002 data are not yet available) are presented in Table 3-5. These monitoring data represent the most current five years of data. It should be noted that the El Toro monitoring station was relocated to Mission Viejo in 2000. Therefore, the 2000 to 2002 monitoring data are from the Mission Viejo monitoring station.

As the data in Tables 3-4 and 3-5 indicate, O_3 levels have decreased slightly in these areas over the past five years. They exceeded the federal NAAQS standard at El Toro/Mission Viejo no more than twice per year. At Oceanside, the peak O_3 concentrations did not exceed the federal NAAQS in the past five years. The numbers of exceedances of the state O_3 AAQS have decreased at the Oceanside station. However, there does not seem to be a downward trend at the El Toro/Mission Viejo Station.

CO levels were below the state and federal one-hour and eight-hour AAQS every year at both the El Toro/Mission Viejo and Oceanside stations. NO_2 is monitored only at the Oceanside station. No NO_2 exceedances were recorded at the Oceanside station during the past five years.

PM10 concentrations fluctuate from year to year, depending on localized weather conditions. Both air districts collect PM10 samples every six days, and calculate the total number of days that likely exceeded the state and federal NAAQS. There were no exceedances of the federal 24 hour NAAQS or the federal annual NAAQS at either station over the five year period. The state PM10 daily AAQS is exceeded on a regular basis. At El Toro/Mission Viejo, the calculated days exceeding the state AAQS varied from 6 to 36 days per year. The PM10 levels exceeded the state AAQS at the Oceanside station during one of the five years (i.e., calculated 6 days), did not exceed the state AAQS in two of the five years, and for the other two years no data is available.

TABLE 3-4
SUMMARY OF AIR QUALITY DATA FROM THE EL TORO MONITORING STATION

Pollutant Standards	1998	1999	2000*	2001*	2002*
Ozone (O_3)					
State std. (1-hr. avg. 0.09 ppm)					
Federal std. (1-hr avg. 0.12 ppm)					
Federal std. (8-hr avg. 0.08 ppm)					
Max. concentration 1-hr period (in ppm)	0.156	0.099	0.119	0.125	0.136
Max. concentration 8-hr period (in ppm)	0.110	0.081	0.087	0.097	0.093
No. of days state 1-hrstd. exceeded	14	2	3	10	9
No. of days federal 1-hr std. exceeded	2	0	0	1	2
No. of days federal 8-hr std. exceeded	3	0	2	2	1
Carbon Monoxide (CO)					
State std. (1-hr. avg. 20 ppm)					
Federal std. (1-hr avg. 35 ppm)					
State std. (8-hr. avg. 9.0 ppm)					
Federal std. (8-hr avg. 9 ppm)					
Max. concentration 1-hr period (in ppm)	5.8	4.1	4.3	3.2	3.4
Max. concentration 8-hr period (in ppm)	3.2	2.6	3.1	2.4	1.9
No. of days state 1-hr std. exceeded	0	0	0	0	0
No. of days federal 1-hr std. exceeded	0	0	0	0	0
No. of days state 8-hr std. exceeded	0	0	0	0	0
No. of days federal 8-hr std. exceeded	0	0	0	0	0
Nitrogen Dioxide (NO_2)					
State std. (1-hr avg. 0.25 ppm)					
Federal std. (0.0534 AAM in ppm)					
% annual arithmetic mean exceeded					
Max. 1-hr concentration (in ppm)	NM	NM	NM	NM	NM
No. of days state 1-hr std. exceeded					
No. of days federal 1-hr std. exceeded					
Respirable Particulates (PM10)					
State std. (24-hr. avg. 50 μg/m^3)					
Federal std. (24-hr avg. 150 μg/m^3)					
Max. 24-hr concentration	70	111	98	60	80
Calculated days exceeding state std.	36	36	12	18	30
Calcd. days exceeding federal 24-hr std.	0	0	0	0	0
Federal std. (AAM 50 μg/m^3)					
State std. (AGM 30 μg/m^3)					
Annual Arithmetic Mean (AAM)	30.8	36.7	N.D.	N.D.	N.D.
Exceed Federal Std.?	No	No	No	N.D.	N.D.
Annual Geometric Mean (AGM)	28	34.2	25	24	28
Exceed State Std.?	No	No	No	No	No

AAM = Annual Arithmetic Mean ppm = parts per million Avg = average Hr = hour
NM = Not monitored μg/m^3 = micrograms per cubic meter N.D. = No data std = standard
* Data are from the Mission Viejo monitoring station.

Source: CARB Air Quality Data Statistics Web Page (2003).

TABLE 3-5
SUMMARY OF AIR QUALITY DATA FROM THE OCEANSIDE MONITORING STATION

Pollutant Standards	1997	1998	1999	2000	2001
Ozone (O_3)					
State std. (1-hr. avg. 0.09 ppm)					
Federal std. (1-hr avg. 0.12 ppm)					
Federal std. (8-hr avg. 0.08 ppm)					
Max. concentration 1-hr period (in ppm)	0.112	0.105	0.091	0.095	0.104
Max. concentration 8-hr period (in ppm)	0.081	0.088	0.081	0.083	0.089
No. of days state 1-hrstd. exceeded	6	3	0	1	1
No. of days federal 1-hr std. exceeded	0	0	0	0	0
No. of days federal 8-hr std. exceeded	0	1	0	0	1
CARBON MONOXIDE (CO)					
State std. (1-hr. avg. 20 ppm)					
Federal std. (1-hr avg. 35 ppm)					
State std. (8-hr. avg. 9.0 ppm)					
Federal std. (8-hr avg. 9 ppm)					
Max. concentration 1-hr period (in ppm)	6.1	3.2	2.8	N.D.	N.D.
Max. concentration 8-hr period (in ppm)	2.7	2.1	2.0	N.D.	N.D.
No. of days state 1-hr std. exceeded	0	0	0	0	0
No. of days federal 1-hr std. exceeded	0	0	0	0	0
No. of days state 8-hr std. exceeded	0	0	0	0	0
No. of days federal 8-hr std. exceeded	0	0	0	0	0
Nitrogen Dioxide (NO_2)					
State std. (1-hr avg. 0.25 ppm)					
Federal std. (0.0534 AAM in ppm)					
% annual arithmetic mean exceeded	0.018	0.016	0.019	0.017	0.016
Max. 1-hr concentration (in ppm)	0.101	0.087	0.133	0.114	0.096
No. of days state 1-hr std. exceeded	0	0	0	0	0
No. of days federal 1-hr std. exceeded					
Respirable Particulates (PM10)					
State std. (24-hr. avg. 50 $\mu g/m^3$)					
Federal std. (24-hr avg. 150 $\mu g/m^3$)	50	36	N.D.	N.D.	N.D.
Max. 24-hr concentration	0	0	N.D.	N.D.	N.D.
Calculated days exceeding state std.	0	0	N.D.	N.D.	N.D.
Calcd. days exceeding federal 24-hr std.					
Federal std. (AAM 50 $\mu g/m^3$)					
State std. (AGM 30 $\mu g/m^3$)					
Annual Arithmetic Mean (AAM)	24.8	23.2	N.D.	N.D.	N.D.
Exceed Federal Std.?	No	No	N.D.	N.D.	N.D.
Annual Geometric Mean (AGM)	23.7	20.8	N.D.	N.D.	N.D.
Exceed State Std.?	No	No	N.D.	N.D.	N.D.

AAM = Annual Arithmetic Mean ppm = parts per million Avg = average Hr = hour
NM = Not monitored $\mu g/m^3$ = micrograms per cubic meter N.D. = No data std = standard

Source: CARB Air Quality Data Statistics Web Page (May 2003).

3.5.3 ON SITE MONITORING OF PM10 AND CO

Because neither the SCAQMD nor SDAPCD has a monitoring station directly in the SOCTIIP area, the Transportation Corridor Agency (TCA) authorized special monitoring for CO and PM10. These are the two pollutants with the greatest potential to cause local hotspots. Monitoring was conducted by Aerovironment, Inc. at five sites along the projected corridor routes to establish baseline conditions without the SOCTIIP build alternatives. The following sites were selected:

Site 1: Adjacent to a utility building owned by the Santa Margarita Water District, on Oso Parkway two miles east of Felipe. This site is also representative of Tesoro High School. Tesoro High School is located just south of Oso Parkway and several miles east of Antonio Parkway.

Site 2: At a private picnic ground owned by Rancho Mission Viejo Company at Ortega Highway and Cristianitos Road.

Site 3: On the roof of the San Clemente High School administration building at 700 Avenida Pico in San Clemente. This site was selected to identify baseline conditions and exposures to sensitive receptors at the High School.

Site 4: On the roof of a storage building at Our Lady of Fatima Church at 105 La Esperanza, San Clemente. This site contained two side by side samplers and was selected to provide baseline data for areas near Avenida Pico.

Site 5: On the site of a maintenance yard for the San Mateo Campgrounds on the northern perimeter of Camp Pendleton. This site represented the southern boundary of the SOCTIIP study area.

The locations of these five monitoring sites are shown in Figure 3-3.

PM10 was monitored at these five locations during the months of August to October 1995, to sample particulates during the driest period of the year. It was monitored again from mid-January through February 1996, after the area had experienced winter rainfall. CO was also monitored in the January-February 1996 period at the same sites.

Aerovironment collected PM10 samples every three days. The air districts collect PM10 every six days, consistent with federal guidelines. The fall PM10 concentrations are shown in Table 3-6, the winter PM10 concentrations in Table 3-7 and the CO concentrations for all days between January 15 and February 15, 1996 in Table 3-8. In all three tables, readings are also shown for concentrations at El Toro and Oceanside for the same days that were monitored at these five sites.

TABLE 3-6
PM 10 CONCENTRATIONS(in µg/m3)
August 13 to October 12, 1995

Day	SOCTIIP Study Area Sites[1]					El Toro[2] (SCAQMD)	Oceanside[3] (SDAPCD)
	Site 1[4]	Site 2[5]	Site 3[6]	Site 4[7]	Site 5[8]		
Aug. 13	NI	20.26	22.76	23.59	24.43	38	27
16	17.88	NR	20.95	22.03	19.99		
19	19.53	21.64	21.70	26.92	29.14	ND	36
22	15.68	VD	23.54	27.35	27.21		
25	VD	VD	20.67	23.25	21.67	45	27
28	VD	24.28	28.57	23.96	33.68		
31	31.92	33.99	34.20	44.87	38.16	58	44
Sept. 3	23.31	23.47	23.27	25.91	26.49		
6	16.57	17.74	21.89	25.43	27.20	36	32
9	15.85	16.74	16.62	18.21	15.55		
12	28.76	27.34	21.91	29.13	22.84	48	31
15	30.46	28.34	VD	25.07	28.37		
18	19.08	23.65	22.39	25.34	25.31	34	27
21	19.47	18.85	18.75	20.01	20.89		
24	19.22	19.20	20.20	23.35	21.86	30	27
27	20.66	18.12	16.53	24.83	VD		
30	26.08	21.16	26.73	35.54	28.80	45	36
Oct. 3	MF	18.47	22.87	28.69	23.06		
6	22.51	21.35	21.65	27.95	28.41	39	39
9	42.84	37.80	35.34	43.17	39.63		
12	50.82	45.58	43.31	51.61	48.17	62	43

NI Not installed
MF Motor failed
ND No data available
NR Did not run
VD Void

[1] Source: Aerovironment, Inc., (January, 1996).
[2] Source: South Coast Air Quality Management District, (August 7, 1996).
[3] Source: San Diego County Air Pollution Control District, (August 6, 1996).
[4] On Oso Parkway two miles east of Felipe Road.
[5] Ortega Highway and Cristianitos Road: pristine location.
[6] San Clemente High School: administration building roof.
[7] 105 La Esperanza, San Clemente: adjacent to I-5.
[8] San Mateo Campgrounds, Camp Pendleton.

TABLE 3-7
PM 10 CONCENTRATIONS (in µg/m3)
January 15 to February, 1996

Day	SOCTIIP Study Area Sites[1]					El Toro[2] (SCAQMD)	Oceanside[3] (SDAPCD)
	Site 1[4]	Site 2[5]	Site 3[6]	Site 4[7]	Site 5[8]		
Jan. 16	16.71	13.44	17.86	18.35	PF	22.0 R	27.6
19	MF	10.47	4.23	15.98	14.22		
22	8.59	6.80	9.23	12.43	12.28	19.0 R	18.7
25	8.62	5.71	PF	10.30	8.81		
28	6.01	6.71	6.75	7.74	7.53	14.0 R	24.7
31	5.67	6.51	7.51	9.54	9.34		
Feb. 3	10.13	16.07	9.04	MF	10.78	20.0 R	19.3
6	20.21	17.18	16.37	17.57	13.55		
9	12.10	11.94	14.66	15.84	15.25	20.0	26.5
12	23.29	27.40	27.41	32.75	33.40		
15	33.14	29.56	33.35	35.91	32.05	58.0	37.4

MF = Motor Failure
PF = Power Failure
R = Rain

[1] Source: Aerovironment, Inc., (January, 1996).
[2] Source: South Coast Air Quality Management District, (August 7, 1996).
[3] Source: San Diego County Air Pollution Control District, (August 6, 1996).
[4] On Oso Parkway two miles east of Felipe Road.
[5] Ortega Highway and Cristianitos Road: pristine location.
[6] San Clemente High School: administration building roof.
[7] 105 La Esperanza, San Clemente: adjacent to I-5.
[8] San Mateo Campgrounds, Camp Pendleton.

3.5.3.1 Project Site PM10 Monitoring Conclusions

PM10 concentrations were generally higher in the fall than in the winter. All samplings were lower than monitored PM10 for the same period at El Toro/Mission Viejo. Although the concentrations at Sites 1 and 4 exceeded the state PM10 AAQS on October 12, they were lower than at El Toro/Mission Viejo. Except for PM10 on several days in the fall monitoring period, monitored concentrations at the five sites were lower than those recorded at Oceanside.

TABLE 3-8
PEAK DAILY CARBON MONOXIDE CONCENTRATIONS (in ppm)
January 15 to February 15, 1996

DAY	SOCTIIP Study Area Sites[1] Site 1[4]	Site 2[5]	Site 3[6]	Site 4[7]	Site 5[8]	El Toro[2] (SCAQMD)	Oceanside[3] (SDAPCD)
Jan 15	1.2	0.6	0.4	ND	1.1	5.0	1.6
16	0.7	1.0	0.9	ND	0.7	2.0	1.6
17	0.8	1.0	1.6	0.3	0.7	3.0	1.5
18	0.8	0.7	0.8	0.6	0.6	4.0	1.7
19	0.7	0.8	0.9	0.2	0.6	2.0	1.4
20	0.9	0.7	1.0	0.9	0.8	3.0	1.7
21	0.5	0.7	1.2	0.3	0.6	1.0	1.0
22	0.8	0.8	1.2	0.8	0.6	3.0	1.0
23	0.8	0.8	0.8	0.6	0.7	4.0	1.5
24	0.8	0.9	1.4	1.0	0.9	3.0	1.8
25	0.8	0.9	1.8	0.7	0.7	3.0	1.7
26	1.1	1.1	2.0	1.0	1.0	2.0	2.0
27	1.0	1.2	ND	1.0	1.2	3.0	2.0
28	0.6	0.8	0.8	0.9	0.7	2.0	1.7
29	0.8	0.8	0.6	0.8	0.8	3.0	1.4
30	1.1	0.9	ND	0.8	0.8	3.0	2.0
31	0.5	0.8	0.8	0.3	0.7	1.0	1.1
Feb. 1	0.5	0.7	0.8	0.4	0.8	2.0	1.2
2	0.5	0.7	0.7	0.2	0.7	3.0	1.4
3	0.8	0.8	0.8	0.7	0.7	6.0	1.6
4	1.3	1.1	1.3	1.1	1.2	4.0	2.0
5	2.4	1.3	1.7	2.1	1.8	3.0	1.5
6	1.7	1.8	1.7	2.2	1.3	5.0	1.2
7	1.1	1.8	2.2	3.3	1.7	3.0	2.7
8	0.7	0.9	2.1	2.5	1.1	6.0	1.6
9	0.6	0.9	1.2	0.9	0.8	5.0	1.6
10	0.4	0.8	1.0	0.7	0.7	6.0	0.9
11	1.1	1.2	1.7	1.1	1.0	5.0	1.2
12	0.9	1.1	2.7	1.3	1.1	6.0	1.9
13	0.9	1.6	1.6	1.3	0.9	4.0	1.7
14	1.3	0.7	2.2	2.2	0.9	3.0	1.2
15	1.2	ND	2.2	1.5	0.9	5.0	1.2

ND = No Data

[1] Source: Aerovironment, Inc., (January, 1996).
[2] Source: South Coast Air Quality Management District, (August 7, 1996).
[3] Source: San Diego County Air Pollution Control District, (August 6, 1996).
[4] On Oso Parkway two miles east of Felipe Road.
[5] Ortega Highway and Cristianitos Road: pristine location.
[6] San Clemente High School: administration building roof.
[7] 105 La Esperanza, San Clemente: adjacent to I-5.
[8] San Mateo Campgrounds, Camp Pendleton.

3.5.3.2 Project Site Monitoring Conclusions

Background concentrations of both PM10 and CO at the five sites more closely approximate comparable readings at Oceanside than at El Toro throughout the monitoring periods. In most cases, CO readings were lower at the five sites than at either monitoring station. Both the federal and state CO AAQS are not exceeded at either the five sites or at the monitoring stations.

3.6 EXISTING EMISSIONS

Air quality is often evaluated at three different levels; regional, subregional, and local. Regional air quality generally refers to the entire air basin. For the SOCTIIP, the South Coast Air Basin (SCAB) is the primary air basin of concern. Emissions in the SCAB disperse from the source, mix and result in the air quality that is shared by most people in the air basin. For example, emissions released in the morning in downtown Los Angeles often determine the afternoon air quality in the east part of the SCAB, most notably the Riverside and San Bernardino areas. Under certain weather conditions, the Los Angeles emissions can have a large effect on air quality levels in South Orange and San Diego Counties. On still other days, the emission of pollutants in Riverside can affect south Orange County pollutant levels.

The converse is also true; emissions generated in Orange County affect the surrounding counties. Emissions released in Orange County normally travel to the east in the afternoon hours towards Riverside County. However, emissions released in Orange County have also been tracked traveling to the north and to the northwest, contributing to pollutant concentrations in Los Angeles, Riverside and San Bernardino Counties (SCAQMD, 1977).

San Diego pollutant concentrations are often heavily influenced by the pollutants that originate in the SCAB. Transported pollution from the SCAB caused numerous exceedances of the ozone standard in San Diego County, preventing the County from meeting their 1999 attainment date goal for achieving the national ozone standard (SDAPCD, 2002). Nighttime winds commonly blow offshore in the SCAB area. Pollutants generated in the SCAB will travel offshore and out over the ocean. They often travel southeast until the daytime onshore breeze begins to develop. This onshore breeze will often transport the over ocean pollutants towards and into San Diego County.

Wind patterns in San Diego County generally follow the day and night onshore and offshore pattern. During the afternoon the winds blow from the west through the County area. At night, the winds die and then develop a drainage flow towards the ocean. After sunrise, these winds diminish and the cycle repeats (U.S. Weather Bureau, 1965).

The regional analysis is used to answer the question of whether overall will the region's air quality be affected by the project? Will the overall emissions in the basin go up or down with the implementation of the project, and will the increase or decrease or decrease be significant?

A subregional area refers to a part of the SCAB. For this study, subregion was defined as south Orange County, and area roughly corresponding to the area south of the Costa Mesa Freeway (SR 55). Emissions are released, travel downwind, chemically react with other air constituents, disperse and finally result in the air quality that we breath. Ozone, for example, is not released directly and is a result of chemical reactions of other pollutants, most notably hydrocarbons and nitrogen dioxide. Ozone may take several hours to form. In fact, emissions released in the late afternoon often do not react to form ozone until the next day when sunlight is available to drive the chemical reactions. The relationship between emissions released and the final pollutant levels is a very complex process for regional air quality. Therefore, at the regional and subregional levels, emissions, rather than pollutants levels, are usually evaluated. If the emission levels increase, then it is generally assumed that the levels of pollutants will also go up.

The SOCTIIP alternatives are anticipated to affect the traffic patterns throughout south Orange County. Therefore, this is an appropriate area to assess whether all emissions increase or decrease under each alternative. It is important to look at the emissions for the subregion. While it is common for a project not to significantly increase or decrease the emissions on a regional scale (after all the region is very large) it may be possible that the project increases the emissions significantly in the area immediately surrounding the project.

Local air quality refers to the resulting pollution levels within a few hundred feet of the pollutant source or within a few thousand feet for major pollutant sources such as power plants. For the SOCTIIP the major concern will be pollutant concentrations near the build alternatives and near roads or intersections potentially affected by the alternatives. The local air quality assessments answer the question of whether the project will result in high or unhealthy levels of pollutants very near corridor alignments or near roadways affected by the project? For local air quality impacts, the concern is for pollutants that are emitted along the road or roads of concern. The amount of dispersion and chemical reactions that occur are minimal compared to the regional and subregional settings. Therefore, computer models are used to evaluate the levels of air pollutants that will be generated near these roads. The pollutant levels or concentrations are compared to the AAQS to determine if an exceedance of the AAQS will occur.

In summary, changes in emissions will be used to evaluate impacts on a regional and subregional scale. Changes in pollutant concentrations are used to evaluate local air quality impacts. The following sections describe the existing regional, subregional and local air setting for the SOCTIIP analyses.

3.6.1 REGIONAL EMISSIONS

The most recent regional emission estimates are contained in the "1997 Air Quality Management Plan" (AQMP) developed by the SCAQMD and SCAG. Two emission forecasts are presented in the AQMP for the year 2000. The first is an average annual day which simply represents the average emissions per day for the SCAB. The second is a planning inventory which shows summertime emission estimates for ozone precursors (i.e., volatile organic compounds, referred to as VOC and NOx) and wintertime precursors (i.e., NOx and CO). Both inventories have similar values. However, the planning inventory is generally considered to be the more important emission projections since it is used as the basis for determining additional emission controls in the SCAB and whether the NAAQS for the SCAB will be met by the target date. The 2000 planning inventory emissions are presented in Table 3-9. The planning inventory values are used for VOC, NOx, and CO. The values for SOx and PM10 are from the average annual day estimates because there are no estimates in the planning inventory for these two pollutants.

TABLE 3-9
PLANNING INVENTORY EMISSIONS FOR SCAB FOR YEAR 2000
metric tons per day (tons per day)

	Summer Ozone Precursors		**Winter Precursors**			
	VOC	**NOx**	**NOx**	**CO**	**SOx**	**PM10**
Total Stationary Sources	**425 (468)**	**99 (109)**	**118 (130)**	**268 (295)**	**16 (18)**	**372 (410)**
Mobile Sources						
On-Road Vehicles	303 (334)	462 (509)	485 (535)	2,992 (3,298)	13 (14)	15 (16)
Off-Road Vehicles	122 (135)	270 (298)	268 (295)	1,405 (1,549)	31 (34)	13 (15)
Total Mobile Sources	**425 (469)**	**732 (807)**	**753 (830)**	**4,397 (4,847)**	**44 (48)**	**28 (31)**
TOTAL	***850 (937)***	***831 (916)***	***871 (960)***	***4,665 (5,142)***	***60 (66)***	***400 (441)***

Source: AQMP

The relative contributions of the sources vary greatly depending on the pollutant. For NOx, mobile sources, which are primarily automobiles, dominate the emissions generated in the SCAB. PM10 emissions are due primarily to stationary sources with only a small contribution due to motor vehicles.

The relative contribution of on-road and off-road mobile source emissions is also noteworthy. Off-road vehicles include aircraft, ships, construction equipment and some other minor categories. For all pollutant species, off-road emissions contribute a substantial part of regional emissions. For SOx, off road emissions are the single largest category.

Regional emissions for San Diego County are presented in Table 3-10. The emissions data are from the "Ozone Redesignation Request and Maintenance Plan for San Diego County," (San Diego County Air Pollution Control District, December 2002). Only emission estimates for VOC and NOx are available. The emissions in San Diego County are about 1/4 the emissions for SCAB. Mobile sources in San Diego County are the most significant group of emissions for the County.

TABLE 3-10
PLANNING INVENTORY EMISSIONS FOR SAN DIEGO AIR BASIN
YEAR 2001
metric tons per day (tons per day)

	VOC	NOx
Total Stationary Sources	43.9 (48.4)	14.5 (16.0)
Total Area-Wide Sources	38.8 (42.8)	1.6 (1.8)
Mobile Sources		
On-Road Vehicles	77.8 (85.8)	131.9 (145.4)
Other Mobile Sources	39.7 (43.8)	70.3 (77.5)
Total Mobile Sources	117.6 (129.6)	202.2 (222.9)
TOTAL	200.3 (220.8)	218.4 (240.7)

Source: SDAPCD, 2002

3.6.2 SUBREGIONAL TRAFFIC EMISSIONS

The SOCTIIP build alternatives have the potential for changing travel patterns in south Orange County. In some cases, a SOCTIIP build alternative may provide a shorter travel route and, therefore, reduce total vehicle miles traveled (VMT). Many of the SOCTIIP build alternatives have the potential to remove vehicles off surface roads and onto the tollway where they will be traveling at a much higher speed. This has the potential to decrease some pollutants, but increase others.

The Traffic and Circulation Technical Report (Austin-Foust Associates, Inc., August 2002) forecasts the daily VMT by speed category for south Orange County. Emission factors to estimate the vehicular emissions were obtained from the California Air Resources Board (CARB). CARB releases emission factors via a large computer database called EMFAC. The emission factors version EMFAC7G was used. Discussions (April 2001) with Mr. Doug Thompson of CARB indicate that EMFAC7G should be used for regional emissions forecasts. This approach is confirmed in a letter from Mr. David Howekamp, Director, Air Quality Management Division of the United States Environmental Protection Agency (letter addressed to Mr. Michael Kenny of the California Environmental Protection Agency, dated April 16, 1998). The rationale for use of EMFAC7G is that the current emission inventory for the SCAB in the AQMP used this set of emissions factors. Therefore, regional analyses should use the same set of emission factors to insure consistency with the AQMP. The emission factors are multiplied times the vehicle miles traveled (VMT) for each speed group to determine the total emissions. Speeds were provided by the traffic engineer for the average speed on arterial roadways and on the freeway/tollways. The existing motor vehicle emissions (year 2001) are presented in Table 3-11. It should be emphasized that the emissions presented below represent the traffic roadway network used in the traffic model (Austin-Foust Associates, Inc., August 2002). The traffic network roughly extends from El Toro Road at the northern end to Basilone Road at the southern end. Consult the "SOCTIIP Traffic and Circulation Report," by Austin Foust and Associates for more details. The traffic model is a regional model, and is sometimes referred to as "coarse," meaning that not every roadway is included in the model. All the major roadways in the area are included in the modeling. The real value of the existing emissions forecast is to provide a baseline of comparison for future scenarios. The approach provides a system where different scenarios can fairly accurately be contrasted and compared with one another.

TABLE 3-11
Emissions From The Existing Traffic Network

Pollutant		Existing Emissions
HC	kg./day	174,681
	lbs./day	385,106
CO	kg./day	2,641,638
	lbs./day	5,823,819
NOx	kg./day	392,021
	lbs./day	864,258
PM10	kg./day	11,103
	lbs./day	24,479

3.7 LOCAL AIR QUALITY

3.7.1 CO AND PM10 CRITERIA

Local air quality is a major concern along roads. Carbon monoxide is a primary pollutant. Unlike ozone, CO is directly emitted from a variety of sources. The most notable source of CO is motor vehicles. For this reason, CO concentrations are usually indicative of the local air quality generated by a road network and are used to assess the impacts of the road network on the local air quality. CO criteria will be the first pollutant standard to be exceeded near an intersection and, therefore, is usually the only pollutant assessed for road networks. In recent years as the SCAB has neared attainment for CO, PM10 has become more of a concern. Therefore, PM10 is modeled in addition to CO. PM10 can be a regional or local pollutant. In this section, PM10 is evaluated for its potential for generating local impacts.

Despite low existing and projected regional background concentrations, localized CO hotspots could develop under certain conditions when there is traffic congestion. These hotspots are local areas which would experience exceedances of the state and federal eight-hour CO AAQS. The federal and state one-hour CO AAQS will not be exceeded anywhere in the SCAB, even with increased traffic and congestion, under all current SCAQMD forecasts. Therefore, this analysis will focus on the more critical 8-hour concentrations. Only 8-hour CO concentrations are presented in the main text of this report. (One hour concentrations are included in the computer printouts that are available for viewing at the TCA office.)

The federal CAA requires transportation plans, programs and projects to conform with the SIP. Transportation project-level conformity procedures in the CAA require that individual transportation projects demonstrate that they eliminate or reduce the severity and number of localized CO violations. If there are no localized CO violations in the area substantially affected by the project, the project satisfies the conformity requirement.

Comparisons of projected CO and PM 10 levels with state and federal AAQS indicate the severity of the existing concentrations for intersections in the SOCTIIP study area. The federal and state AAQS for CO and PM10 are presented in Table 3-12.

TABLE 3-12
FEDERAL AND STATE CO AND PM10 STANDARDS

	Averaging Time	Standard
CARBON MONOXIDE (CO)		
Federal	1 hour	35 ppm
	8 hours	9 ppm
State	1 hour	20 ppm
	8 hours	9 ppm
Respirable Particulate Matter (PM10)[1]		
Federal	24 hours	150 µg/m3
State	24 hours	50 µg/m3

1. Annual PM10 standards are not shown because the annual standards reflect regional pollution, not local problems.

3.7.2 CO AND PM10 MODELING

As CO levels have consistently improved over the years, PM10 has shown little change. Therefore, PM10 is becoming more of a concern along busy roads. Areas of most concern are where high levels of traffic operate under heavily congested conditions, or where unusually large numbers of diesel-powered vehicles can be expected to occur. Currently, the project is located in a serious nonattainment area for PM10. At this time, there is no PM10 quantitative analysis guidance established by EPA or the California Department of Transportation (Caltrans) for PM10 analysis. The CALINE4 model was used for the PM10 hot spot analysis.

CO and PM10 levels in the SOCTIIP vicinity due to nearby roads were assessed with the CALINE4 computer model. CALINE4 is a fourth generation line source air quality model developed by the Caltrans ("CALINE4," Report No. FHWA/CA/TL-84/15, June 1989). The purpose of the model is to assess air quality impacts near transportation facilities in what is known as the microscale region. The microscale region encompasses the region of a few miles around a pollutant source. Given source strength, meteorology, site geometry and site characteristics, the model can reliably predict pollutant concentrations. Additional details on the methodology used in the modeling are discussed in Section 4.2 (Local Air Quality Impacts). The remainder of this section discusses the resulting existing CO levels in comparison to the state and federal CO AAQS.

All the intersections modeled in the impact assessment were modeled for this existing setting. EPA guidance suggests modeling the top three intersections in the area based on the highest traffic volume and the top three intersections based on the worst traffic level of service (LOS). For the future case for each of the primary SOCTIIP build alternatives, the six intersections were identified. Additional key intersections were then selected that are common to all the SOCTIIP build alternatives and represent high levels of traffic or congestion. The common intersections are distributed throughout the SOCTIIP study area, and provide a direct comparison among the alternatives. (Refer to Section 4.2 for more discussion on methodology of selecting intersections). For the future cases, additional locations along the proposed corridors were also selected for modeling.

The CALINE4 computer modeling for 2002 was conducted for 12 existing intersections. The intersections were selected based on the highest traffic volumes and congestion levels as well as pertinent land uses. Intersections with high traffic volumes and high demand to capacity ratios in the year 2025 were selected for analysis. Essentially, the worst case intersections in different parts of the County were selected so that the final intersections assessed provided a representation of sites throughout the study area. The 12 selected intersections are I-5/Alicia Parkway, Felipe/Oso Parkway, Antonio Parkway/Oso Parkway, SR 241/Oso Parkway, Crown Valley Parkway/Marguerite, I-5/Ortega Highway, I-5/Vista Hermosa, Antonio Parkway/Ortega Highway, Avenida Pico/La Pata, I-5/El Camino Real, I-5/Avenida Pico, Antonio Parkway/Crown Valley Parkway. These 12 intersections assessed are the worst case intersections in the future years in terms of level of congestion and traffic volumes. As shown in later sections (i.e., Section 4.2) no exceedances of state or federal standards for CO are projected and therefore, analysis of additional intersections is not necessary.

For each intersection, the CO and PM10 modeling was assessed for four receptors, one at each corner of the intersection, and the highest CO concentration levels are presented.

The receptors are located approximately 25 feet (8 meters) from the corners of the intersections. The locations of the receptors are shown in Figure 3-4.

The existing background CO concentrations for 2000 are based on the highest reading at the Mission Viejo/El Toro monitoring station over the last three years. (The El Toro monitoring station was relocated to Mission Viejo in 2000. Therefore, the 1999 CO data were from the El Toro station, and the 2000 to 2002 data were from Mission Viejo station). The 2000 background CO concentrations used are 4.3 ppm for 1-hour, and 3.1 ppm for 8-hour. Therefore, 4.3 ppm is added to the worst-case meteorological 1-hour projections and 3.1 ppm is added to the worst-case 8-hour projections to account for the existing background CO levels. Similarly, 98 µg/m3 was determined to be the appropriate background levels for the 24-hour PM10 projections. It should be noted that this background level exceeds the state AAQS of 50 µg/m3 already, and is slightly less than the federal AAQS of 150 µg/m3.

The existing peak hour traffic and volume/capacity ratio data are from the Traffic and Circulation Technical Report (Austin-Foust Associates, Inc., November 2002). The PM peak hour traffic data is used for the CALINE4 computer modeling as the worst-case scenario, because the PM peak hour traffic is higher than the AM peak hour volumes. The volume/capacity ratio is also known as the level-of-service (LOS) at an intersection. The LOS determines the congestion levels at the intersections, and therefore, is important in the CALINE4 modeling. The LOS determines the average speed used at an intersection. In general, slower speeds result in higher vehicular emission factors, and consequently, higher pollutant levels will result.

The results of the air quality analysis are summarized in Table 3-13 for 1-hour and 8-hour CO concentrations, and for 24-hour PM10 concentrations. The pollutant levels, expressed in ppm for CO, and ug/m3 for 24-hour PM10 concentrations. The modeling levels reported in Table 3-13 are composites of the background levels of CO and PM10 coming into the area plus those generated by the local roads.

TABLE 3-13
EXISTING CO AND PM10 CONCENTRATIONS

	Intersection	1 Hour CO	8 Hour CO	24 Hour PM10
1	I-5/Alicia Pkwy	8.5	6.5	111
2	Felipe/Oso Pkwy	8.0	5.7	105
3	Antonio Pkwy/Oso Pkwy	6.2	4.4	103
4	SR 241/Oso Pkwy	4.9	3.6	100
5	Crown Valley/Marguerite	8.6	6.1	104
6	I-5/Ortega Hwy	7.6	5.7	112
7	Antonio Pkwy/Ortega Hwy	5.5	3.9	103
8	I-5/Vista Hermosa	5.7	4.2	106
9	Ave Pico/La Pata	4.7	3.4	99
10	I-5/El Camino Real	6.5	4.9	109
11	I-5/Ave Pico	9.1	6.9	106
12	Antonio Pkwy/Crown Valley	5.1	3.7	100
State Standard		**20 ppm**	**9 ppm**	**50 µg/m3**
No. of Exceedances		0	0	12
Federal Standard		**35 ppm**	**9 ppm**	**150 µg/m3**
No. of Exceedances		0	0	0

Table 3-13 presents the existing CO and PM10 modeling results at the existing 12 intersections. The existing CO concentration levels at these intersections range between 4.7 and 9.1 ppm for 1-hour and between 3.4 and 6.9 ppm for 8-hour. The results indicate that the existing CO concentrations at these intersections are currently in compliance with both the state and federal CO standards.

The existing PM10 concentrations at these intersections range between 99 and 112 ug/m^3 for 24-hour. The results indicate that the existing PM10 concentrations currently comply with the federal AAQS of 150 ug/m^3; however, the PM10 concentration levels well exceed the state PM10 AAQS of 50 ug/m^3 at all receptor locations. Note that the bulk of the PM10 concentrations are due to the background concentration. The local roadways added 3 to 23 ug/m^3 to the ambient level of 98 ug/m^3 (3% to 23.5%).

SECTION 4.0
POTENTIAL AIR QUALITY IMPACTS

4.1 CONSTRUCTION EMISSIONS

The SOCTIIP will result in short-term emissions from the project construction activities. Air pollutants will be emitted by construction equipment and fugitive dust will be generated from grading activities. Typically, the pollutant emissions due to grading activities would be primarily PM10 while emissions from construction equipment would be CO and NOx. The construction of SOCTIIP will also include demolition of a number of existing residential and non-residential structures.

Peak periods of construction will result in the greatest levels of air pollution emissions. The construction information for the SOCTIIP was based on the worst case peak construction day during which a maximum number of equipment and area (acres) disturbed per day were assumed. Construction equipment would consist of haul trucks, graders, dozers, loaders and other heavy construction equipment, crew size and commuting trips, ancillary equipment, miscellaneous vehicles, and equipment associated with demolition. These construction data were provided by TCA and P&D Consultants, November 2002 and August 2003. The construction data utilized for calculations are available for viewing at the TCA office.)

Construction emissions were analyzed for fourteen scenarios. These scenarios are Ultimate FEC, Ultimate A7C, Ultimate CC, Initial FEC, Initial A7C, Initial CC, AIO, I-5 Widening, Ultimate A7-FEC-M, Ultimate FEC-M, Ultimate FEC-W, Initial A7-FEC-M, Initial FEC-M, and Initial FEC-W.

The durations of the construction periods are anticipated to range between 30 and 42 months, depending on the scenario. The proposed construction work hours are 8 hours a day 5 days a week. The construction equipment data for all fourteen scenarios are shown in Tables 4-1 through 4-14.

TABLE 4-1
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE FEC

Equipment Description	Diesel (D) Gas (G)	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	7
36 cubic meter Self Propelled Scraper	D	46
Self propelled Sheepsfoot Compactor	D	16
D6 Dozer	D	12
D8 Dozer	D	17
D10 Dozer	D	16
D11 Dozer	D	3
3 cubic meter Rubber Tired Front Loader	D	26
40 cubic meter Off Road Dump Truck	D	12
25 cubic meter Off Road Dump Truck	D	5
10,000 Gallon Water Pull	D	6
4000 Gallon Water Truck	D	11
3 cubic meter Trackhoe Excavator	D	8
1/2 cubic meter Rubber Tired Backhoe	D	11
Motor Graders	D	16
1/2 ton Pick-up Truck	G	81
3/4 ton Pick-up Truck	G	17
1 ton Stake Bed Truck	G	13
3/4 ton Mechanic Truck	G	6
Fuel / Lube Tandem Truck	D	6
15 cubic meter Belly Dump Trucks	D	25
8 cubic meter Tandem Dump Trucks	D	15
Structures:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-1 (continued)
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE FEC

Equipment Description	Diesel (D) Gas (G)	No. Required
Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	3

Assumptions:

Construction Duration: 42 Months
Normal Work Hours: 8 hrs/day @ 5 days per week

Earthwork Quantities: 19,300,000 cm (Embankment)
22,000,000 cm (Remedial Grading)
1,500,000 cm (Export)

Minimal Demolition Required

TABLE 4-2
CONSTRUCTION EQUIPMENT LIST FOR INITIAL FEC

Equipment Description	Diesel (D) Gas (G)	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	7
36 cubic meter Self Propelled Scraper	D	40
Self propelled Sheepsfoot Compactor	D	14
D6 Dozer	D	11
D8 Dozer	D	15
D10 Dozer	D	14
D11 Dozer	D	3
3 cubic meter Rubber Tired Front Loader	D	23
40 cubic meter Off Road Dump Truck	D	11
25 cubic meter Off Road Dump Truck	D	5
10,000 Gallon Water Pull	D	6
4000 Gallon Water Truck	D	10
3 cubic meter Trackhoe Excavator	D	13
1/2 cubic meter Rubber Tired Backhoe	D	10
Motor Graders	D	14
1/2 ton Pick-up Truck	G	73
3/4 ton Pick-up Truck	G	15
1 ton Stake Bed Truck	G	11
1/2 ton Mechanic Truck	G	6
Fuel / Lube Tandem Truck	D	6
15 cubic meter Belly Dump Trucks	D	41
8 cubic meter Tandem Dump Trucks	D	25
Structures:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-2 (continued)
CONSTRUCTION EQUIPMENT LIST FOR INITIAL FEC

Equipment Description	Diesel (D) Gas (G)	No. Required
Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	3

Assumptions:

Construction Duration: 39 Months
Normal Work Hours: 8 hrs/day @ 5 days per week

Earthwork Quantities: 11,900,000 cm (Embankment)
20,600,000 cm (Remedial Grading)
2,300,000 cm (Export)

Minimal Demolition Required

TABLE 4-3
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE CC

Equipment Description	Diesel (D) Gas (G)	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	8
36 cubic meter Self Propelled Scraper	D	53
Self propelled Sheepsfoot Compactor	D	16
D6 Dozer	D	14
D8 Dozer	D	20
D10 Dozer	D	19
D11 Dozer	D	5
3 cubic meter Rubber Tired Front Loader	D	29
40 cubic meter Off Road Dump Truck	D	14
25 cubic meter Off Road Dump Truck	D	5
10,000 Gallon Water Pull	D	7
4000 Gallon Water Truck	D	12
3 cubic meter Trackhoe Excavator (3 @ Double Shift)	D	9
1/2 cubic meter Rubber Tired Backhoe	D	12
Motor Graders	D	18
1/2 ton Pick-up Truck (2 @ Double Shift)	G	90
3/4 ton Pick-up Truck	G	20
1 ton Stake Bed Truck	G	15
3/4 ton Mechanic Truck (1 @ Double Shift)	G	7
Fuel / Lube Tandem Truck (1 @ Double Shift)	D	7
15 cubic meter Belly Dump Trucks (Double Shift)	D	40
8 cubic meter Tandem Dump Trucks (Double Shift)	D	20
Structures:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-3 (continued)
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE CC

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Demolition:		
3 cubic meter Trackhoe Excavator with Claw Attachment	D	4
2 cubic meter Rubber Tired Front Loader	D	4
Handheld concrete saws	G	12
1/2 Ton pick-ups	G	4
1 Ton Stake trucks	G	4
Tandem Dump Trucks	D	16
45 Ton Mobile Crane	D	2
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper (2 @ Double Shift)	G	5

Assumptions:

Construction Duration: 42 Months
Normal Work Hours: 8 hrs/day @ 5 days per week

Earthwork Quantities: 14,600,000 cm (Embankment)
32,400,000 cm (Remedial Grading)
4,800,000 cm (Export)

Significant Demolition Required

TABLE 4-4
CONSTRUCTION EQUIPMENT LIST FOR INITAL CC

Equipment Description	Diesel (D) Gas (G)	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	8
36 cubic meter Self Propelled Scraper	D	59
Self propelled Sheepsfoot Compactor	D	15
D6 Dozer	D	13
D8 Dozer	D	19
D10 Dozer	D	18
D11 Dozer	D	5
3 cubic meter Rubber Tired Front Loader	D	27
40 cubic meter Off Road Dump Truck	D	13
25 cubic meter Off Road Dump Truck	D	5
10,000 Gallon Water Pull	D	7
4000 Gallon Water Truck	D	11
3 cubic meter Trackhoe Excavator (3 @ Double Shift)	D	9
1/2 cubic meter Rubber Tired Backhoe	D	11
Motor Graders	D	17
1/2 ton Pick-up Truck	G	85
3/4 ton Pick-up Truck	G	29
1 ton Stake Bed Truck	G	14
1/2 ton Mechanic Truck	G	7
Fuel / Lube Tandem Truck	D	7
15 cubic meter Belly Dump Trucks (Double Shift)	D	49
8 cubic meter Tandem Dump Trucks (Double Shift)	D	24
Structures:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-4 (continued)
CONSTRUCTION EQUIPMENT LIST FOR INITAL CC

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Demolition:		
3 cubic meter Trackhoe Excavator with Claw Attachment	D	4
2 cubic meter Rubber Tired Front Loader	D	4
Handheld concrete saws	G	12
1/2 Ton pick-ups	G	4
1 Ton Stake trucks	G	4
Tandem Dump Trucks	D	16
45 Ton Mobile Crane	D	2
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	5

Assumptions:

Construction Duration: 39 Months
Normal Work Hours: 8 hrs/day @ 5 days per week

Earthwork Quantities: 8,900,000 cm (Embankment)
31,100,000 cm (Remedial Grading)
2,700,000 cm (Export)

Significant Demolition Required

TABLE 4-5
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE A7C

Equipment Description	Diesel (D) Gas (G)	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	8
36 cubic meter Self Propelled Scraper	D	53
Self propelled Sheepsfoot Compactor	D	16
D6 Dozer	D	14
D8 Dozer	D	20
D10 Dozer	D	19
D11 Dozer	D	5
3 cubic meter Rubber Tired Front Loader	D	29
40 cubic meter Off Road Dump Truck	D	14
25 cubic meter Off Road Dump Truck	D	5
10,000 Gallon Water Pull	D	7
4000 Gallon Water Truck	D	12
3 cubic meter Trackhoe Excavator (3 @ Double Shift)	D	9
1/2 cubic meter Rubber Tired Backhoe	D	12
Motor Graders	D	18
1/2 ton Pick-up Truck (2 @ Double Shift)	G	90
3/4 ton Pick-up Truck	G	20
1 ton Stake Bed Truck	G	15
3/4 ton Mechanic Truck (1 @ Double Shift)	G	7
Fuel / Lube Tandem Truck (1 @ Double Shift)	D	7
15 cubic meter Belly Dump Trucks (Double Shift)	D	40
8 cubic meter Tandem Dump Trucks (Double Shift)	D	20
Structures:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-5 (continued)
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE A7C

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Demolition:		
3 cubic meter Trackhoe Excavator with Claw Attachment	D	4
2 cubic meter Rubber Tired Front Loader	D	4
Handheld concrete saws	G	12
1/2 Ton pick-ups	G	4
1 Ton Stake trucks	G	4
Tandem Dump Trucks	D	16
45 Ton Mobile Crane	D	2
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper (2 @ Double Shift)	G	5

Assumptions:

Construction Duration: 42 Months
Normal Work Hours: 8 hrs/day @ 5 days per week

Earthwork Quantities: 43,600,000 cm (Embankment)
30,600,000 cm (Remedial Grading)
5,400,000 cm (Export)

Significant Demolition Required

TABLE 4-6
CONSTRUCTION EQUIPMENT LIST FOR INITIAL A7C

Equipment Description	Diesel (D) Gas (G)	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	8
36 cubic meter Self Propelled Scraper	D	59
Self propelled Sheepsfoot Compactor	D	15
D6 Dozer	D	13
D8 Dozer	D	19
D10 Dozer	D	18
D11 Dozer	D	5
3 cubic meter Rubber Tired Front Loader	D	27
40 cubic meter Off Road Dump Truck	D	13
25 cubic meter Off Road Dump Truck	D	5
10,000 Gallon Water Pull	D	7
4000 Gallon Water Truck	D	11
3 cubic meter Trackhoe Excavator (3 @ Double Shift)	D	9
1/2 cubic meter Rubber Tired Backhoe	D	11
Motor Graders	D	17
1/2 ton Pick-up Truck	G	85
3/4 ton Pick-up Truck	G	29
1 ton Stake Bed Truck	G	14
1/2 ton Mechanic Truck	G	7
Fuel / Lube Tandem Truck	D	7
15 cubic meter Belly Dump Trucks (Double Shift)	D	49
8 cubic meter Tandem Dump Trucks (Double Shift)	D	24
Structures:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-6 (continued)
CONSTRUCTION EQUIPMENT LIST FOR INITIAL A7C

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Demolition:		
3 cubic meter Trackhoe Excavator with Claw Attachment	D	4
2 cubic meter Rubber Tired Front Loader	D	4
Handheld concrete saws	G	12
1/2 Ton pick-ups	G	4
1 Ton Stake trucks	G	4
Tandem Dump Trucks	D	16
45 Ton Mobile Crane	D	2
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	5

Assumptions:

Construction Duration: 39 Months
Normal Work Hours: 8 hrs/day @ 5 days per week

Earthwork Quantities: 35,500,000 cm (Embankment)
30,500,000 cm (Remedial Grading)
2,300,000 cm (Export)

Significant Demolition Required

TABLE 4-7
CONSTRUCTION EQUIPMENT LIST FOR AIO

Equipment Description	Diesel (D) Gas (G)	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	20
Self propelled Sheepsfoot Compactor	D	10
D6 Dozer	D	6
D8 Dozer	D	6
3 cubic meter Rubber Tired Front Loader	D	15
Heavy Duty Forklift	D	2
4000 Gallon Water Truck	D	8
3 cubic meter Trackhoe Excavator	D	6
1/2 cubic meter Rubber Tired Backhoe	D	6
Motor Graders	D	10
1/2 ton Pick-up Truck	G	44
3/4 ton Pick-up Truck	G	10
1 ton Stake Bed Truck	G	8
3/4 ton Mechanic Truck	G	4
Fuel / Lube Tandem Truck	D	4
15 cubic meter Belly Dump Trucks	D	40
8 cubic meter Tandem Dump Trucks	D	20
Bridge:		
100 ton Self Propelled Track Crane	D	2
60 ton Truck Crane	D	2
45 Ton Rubber Tired Mobile Crane	D	2
25 Ton Rubber Tired Mobile Crane	D	2
Pile Driving Leads and Hammer	D	1
Heavy Duty Forklift	D	2
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10
Paving:		
Asphalt Paving Machine	D	2
Steel Wheel Tandem Roller	D	2
Steel Wheel Vibrator Roller	D	2
Rubber Tired Roller	D	2
15 Cubic meter Asphalt Belly Dump Trucks	D	25

Table 4-7 (continued)
CONSTRUCTION EQUIPMENT LIST FOR AIO

Bridge/Roadway Demolition:		
3 cubic meter Trackhoe Excavator with Claw Attachment	D	2
Tandem Dump Trucks	D	10
Concrete Pavement Breaker	D	2
Concrete Saw - Tire mounted (6 hp)	G	2
Concrete Saw - Hand held (2 hp)	G	2
Air Powered Jack Hammer & Air compressor	D	2
Misc:		
IR 175 Air Compressors	G	10
10 HP Generators	G	10
Hand Operated Vibraplate compactors	G	10
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	1
Concrete Saw – Hand held (2 hp)	G	5
Concrete Saw – Tire mounted (6 hp)	G	0
Concrete Pavement Breaker	D	0
1/2 ton Traffic Control Truck	G	1
Stake Bed Traffic Control Truck	G	1
Tandem Traffic Control Truck with Attenuator	D	1
Street Sweeper	G	2

Assumptions:

Construction Duration: 30 Months
Normal Work Hours: 8 hrs/day @ 5 days per week

Earthwork Quantities: 3,700,000 cm (Embankment)
11,200,000 cm (Remedial Grading)
1,100,000 cm (Export)

Substantial Demolition Required

TABLE 4-8
CONSTRUCTION EQUIPMENT LIST FOR I-5 WIDENING

Equipment Description	Diesel (D) Gas (G)	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	5
Self propelled Sheepsfoot Compactor	D	10
D6 Dozer	D	10
D8 Dozer	D	6
D10 Dozer	D	10
3 cubic meter Rubber Tired Front Loader	D	18
Heavy Duty Forklift	D	4
4000 Gallon Water Truck	D	12
3 cubic meter Trackhoe Excavator (6 @ Double Shift)	D	12
1/2 cubic meter Rubber Tired Backhoe	D	12
Motor Graders	D	15
1/2 ton Pick-up Truck	G	75
3/4 ton Pick-up Truck	G	15
1 ton Stake Bed Truck	G	20
3/4 ton Mechanic Truck (1 @ Double Shift)	G	7
Fuel / Lube Tandem Truck (1 @ Double Shift)	D	7
15 cubic meter Belly Dump Trucks (40 @ Double Shift)	D	60
8 cubic meter Tandem Dump Trucks (25 @ Double Shift)	D	30
Bridge:		
100 ton Self Propelled Track Crane	D	8
60 ton Truck Crane	D	10
45 Ton Rubber Tired Mobile Crane	D	10
25 Ton Rubber Tired Mobile Crane	D	10
Pile Driving Leads and Hammer	D	3
Heavy Duty Forklift	D	10
Concrete Pump Truck	D	5
Low Boy Tractor Trailers	D	4
Concrete Trucks	D	30

Table 4-8 (continued)
CONSTRUCTION EQUIPMENT LIST FOR I-5 WIDENING

Paving:		
Concrete Paver	D	4
Asphalt Paving Machine	D	2
Steel Wheel Tandem Roller	D	2
Steel Wheel Vibrator Roller	D	2
Rubber Tired Roller	D	2
14 Cubic meter Asphalt Belly Dump Trucks	D	25
Concreter Trucks	D	20
Demolition:		
3 cubic meter Trackhoe Excavator with Claw Attachment	D	16
3 cubic meter tired front loader	D	8
Concrete Saw - Hand held (2 hp)	G	24
1/2 ton pick-ups	G	16
1 ton stake trucks	G	16
Tandem Dump Trucks	D	64
45 ton mobile crane	D	8
Misc:		
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	10
1/2 ton Traffic Control Truck	G	8
Stake Bed Traffic Control Truck	G	4
Tandem Traffic Control Truck with Attenuator	D	4
Street Sweeper (2 @ Double Shift)	G	6

Assumptions:

Construction Duration: 42 Months
Normal Work Hours: 8 hrs/day @ 5 days per week

Earthwork Quantities: 2,300,000 cm (Embankment)
4,400,000 cm (Remedial Grading)
4,300,000 cm (Export)

Substantial Demolition Required

TABLE 4-9
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE A7-FEC-M

Equipment Description	**Diesel** (D) Gas **(G)**	**No. Required**
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	5
36 cubic meter Self Propelled Scraper	D	32
Self propelled Sheepsfoot Compactor	D	7
D6 Dozer	D	6
D8 Dozer	D	8
D10 Dozer	D	8
D11 Dozer	D	2
3 cubic meter Rubber Tired Front Loader	D	12
40 cubic meter Off Road Dump Truck	D	9
25 cubic meter Off Road Dump Truck	D	3
10,000 Gallon Water Pull	D	5
4000 Gallon Water Truck	D	6
3 cubic meter Trackhoe Excavator	D	5
1/2 cubic meter Rubber Tired Backhoe	D	5
Motor Graders	D	7
1/2 ton Pick-up Truck	G	52
3/4 ton Pick-up Truck	G	10
1 ton Stake Bed Truck	G	6
1/2 ton Mechanic Truck	G	4
Fuel / Lube Tandem Truck	D	4
Off-site Equipment for Embankment Import:		
3 cubic meter Trackhoe Excavator	D	7
Belly Dump Truck	D	62
Tandem Dump Truck	D	27
Bridge:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-9 (continued)
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE A7-FEC-M

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	3

Assumptions:

Construction Duration: 42 Months
Normal Work Hours: 8 hrs/day @ 5 days per week
Double Shift: Not Required

Earthwork Quantities: 14,192,167 cm (Embankment)
13,400,000 cm (Remedial Grading)
2,310,473 cm (Export)

Minimum Demolition Required
Connection to the I-5

TABLE 4-10
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE FEC-M

Equipment Description	**Diesel** (D) Gas **(G)**	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	7
36 cubic meter Self Propelled Scraper	D	35
Self propelled Sheepsfoot Compactor	D	13
D6 Dozer	D	10
D8 Dozer	D	14
D10 Dozer	D	13
D11 Dozer	D	3
3 cubic meter Rubber Tired Front Loader	D	21
40 cubic meter Off Road Dump Truck	D	10
25 cubic meter Off Road Dump Truck	D	5
10,000 Gallon Water Pull	D	6
4000 Gallon Water Truck	D	9
3 cubic meter Trackhoe Excavator	D	8
1/2 cubic meter Rubber Tired Backhoe	D	9
Motor Graders	D	13
1/2 ton Pick-up Truck	G	64
3/4 ton Pick-up Truck	G	12
1 ton Stake Bed Truck	G	9
1/2 ton Mechanic Truck	G	5
Fuel / Lube Tandem Truck	D	5
15 Cubic meter Asphalt Belly Dump Trucks	D	50
8 Cubic meter Tandem Dump Trucks	D	30
Bridge:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-10 (continued)
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE FEC-M

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	3

Assumptions:

Construction Duration: 42 Months
Normal Work Hours: 8 hrs/day @ 5 days per week
Double Shift: Not Required

Earthwork Quantities: 13,712,160 cm (Embankment)
14,200,000 cm (Remedial Grading)
3,019,782 cm (Export)

Minimum Demolition Required
Direct Connection to the I-5

TABLE 4-11
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE FEC-W

Equipment Description	**Diesel** (D) Gas **(G)**	**No. Required**
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	7
36 cubic meter Self Propelled Scraper	D	35
Self propelled Sheepsfoot Compactor	D	13
D6 Dozer	D	10
D8 Dozer	D	14
D10 Dozer	D	13
D11 Dozer	D	3
3 cubic meter Rubber Tired Front Loader	D	21
40 cubic meter Off Road Dump Truck	D	10
25 cubic meter Off Road Dump Truck	D	5
10,000 Gallon Water Pull	D	5
4000 Gallon Water Truck	D	9
3 cubic meter Trackhoe Excavator	D	6
1/2 cubic meter Rubber Tired Backhoe	D	9
Motor Graders	D	13
1/2 ton Pick-up Truck	G	63
3/4 ton Pick-up Truck	G	12
1 ton Stake Bed Truck	G	9
1/2 ton Mechanic Truck	G	4
Fuel / Lube Tandem Truck	D	4
Off-site Equipment for Embankment Import:		
3 cubic meter Trackhoe Excavator	D	3
Belly Dump Truck	D	26
Tandem Dump Truck	D	13
Bridge:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-11 (continued)
CONSTRUCTION EQUIPMENT LIST FOR ULTIMATE FEC-W

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	3

Assumptions:

Construction Duration: 42 Months
Normal Work Hours: 8 hrs/day @ 5 days per week
Double Shift: Not Required

Earthwork Quantities: 14,992,722 cm (Embankment)
12,500,000 cm (Remedial Grading)
871,329 cm (Export)

Minimal Demolition Required
Direct Connection to the I-5

TABLE 4-12
CONSTRUCTION EQUIPMENT LIST FOR INITIAL A7C-FEC-M

Equipment Description	**Diesel** (D) Gas **(G)**	No. Required
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	5
36 cubic meter Self Propelled Scraper	D	32
Self propelled Sheepsfoot Compactor	D	7
D6 Dozer	D	6
D8 Dozer	D	8
D10 Dozer	D	8
D11 Dozer	D	2
3 cubic meter Rubber Tired Front Loader	D	12
40 cubic meter Off Road Dump Truck	D	9
25 cubic meter Off Road Dump Truck	D	4
10,000 Gallon Water Pull	D	5
4000 Gallon Water Truck	D	6
3 cubic meter Trackhoe Excavator	D	5
1/2 cubic meter Rubber Tired Backhoe	D	5
Motor Graders	D	7
1/2 ton Pick-up Truck	G	52
3/4 ton Pick-up Truck	G	10
1 ton Stake Bed Truck	G	6
1/2 ton Mechanic Truck	G	4
Fuel / Lube Tandem Truck	D	3
Off-site Equipment for Embankment Import:		
3 cubic meter Trackhoe Excavator	D	4
Belly Dump Truck	D	37
Tandem Dump Truck	D	16
Bridge:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-12 (continued)
CONSTRUCTION EQUIPMENT LIST FOR INITIAL A7C-FEC-M

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	3

Assumptions:

Construction Duration: 439 Months
Normal Work Hours: 8 hrs/day @ 5 days per week
Double Shift: Not Required

Earthwork Quantities: 12,149,089 cm (Embankment)
12,703,000 cm (Remedial Grading)
1,380,616 cm (Export)

Minimal Demolition Required
Connection to the I-5

TABLE 4-13
CONSTRUCTION EQUIPMENT LIST FOR INITIAL FEC-M

Equipment Description	**Diesel** (D) Gas **(G)**	**No. Required**
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	6
36 cubic meter Self Propelled Scraper	D	31
Self propelled Sheepsfoot Compactor	D	11
D6 Dozer	D	9
D8 Dozer	D	12
D10 Dozer	D	11
D11 Dozer	D	3
3 cubic meter Rubber Tired Front Loader	D	18
40 cubic meter Off Road Dump Truck	D	9
25 cubic meter Off Road Dump Truck	D	4
10,000 Gallon Water Pull	D	5
4000 Gallon Water Truck	D	8
3 cubic meter Trackhoe Excavator	D	10
1/2 cubic meter Rubber Tired Backhoe	D	8
Motor Graders	D	11
1/2 ton Pick-up Truck	G	61
3/4 ton Pick-up Truck	G	12
1 ton Stake Bed Truck	G	9
1/2 ton Mechanic Truck	G	5
Fuel / Lube Tandem Truck	D	5
15 Cubic meter Asphalt Belly Dump Trucks	D	6
8 Cubic meter Tandem Dump Trucks	D	5
Bridge:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-13 (continued)
CONSTRUCTION EQUIPMENT LIST FOR INITIAL FEC-M

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	3
Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25

Assumptions:

Construction Duration: 39 Months
Normal Work Hours: 8 hrs/day @ 5 days per week
Double Shift: Not Required

Earthwork Quantities: 11,008,060 cm (Embankment)
13,513,000 cm (Remedial Grading)
3,299,396 cm (Export)

Minimal Demolition Required
Direct Connection to the I-5

TABLE 4-14
CONSTRUCTION EQUIPMENT LIST FOR INITIAL FEC-W

Equipment Description	**Diesel** (D) Gas **(G)**	**No. Required**
Grading / Drainage:		
15 cubic meter Self Propelled Scraper	D	6
36 cubic meter Self Propelled Scraper	D	31
Self propelled Sheepsfoot Compactor	D	11
D6 Dozer	D	9
D8 Dozer	D	12
D10 Dozer	D	11
D11 Dozer	D	3
3 cubic meter Rubber Tired Front Loader	D	18
40 cubic meter Off Road Dump Truck	D	9
25 cubic meter Off Road Dump Truck	D	4
10,000 Gallon Water Pull	D	5
4000 Gallon Water Truck	D	8
3 cubic meter Trackhoe Excavator	D	10
1/2 cubic meter Rubber Tired Backhoe	D	8
Motor Graders	D	11
1/2 ton Pick-up Truck	G	61
3/4 ton Pick-up Truck	G	12
1 ton Stake Bed Truck	G	9
1/2 ton Mechanic Truck	G	5
Fuel / Lube Tandem Truck	D	5
Off-site Equipment for Embankment Import:		
3 cubic meter Trackhoe Excavator	D	2
Belly Dump Truck	D	18
Tandem Dump Truck	D	9
Bridge:		
100 ton Self Propelled Track Crane	D	5
60 ton Truck Crane	D	4
45 Ton Rubber Tired Mobile Crane	D	4
25 Ton Rubber Tired Mobile Crane	D	4
Pile Driving Leads and Hammer	D	2
Heavy Duty Forklift	D	4
Concrete Pump Truck	D	2
Low Boy Tractor Trailers	D	2
Concrete Trucks	D	10

Table 4-14 (continued)
CONSTRUCTION EQUIPMENT LIST FOR INITIAL FEC-W

Paving:		
Asphalt Paving Machine	D	3
Steel Wheel Tandem Roller	D	3
Steel Wheel Vibrator Roller	D	3
Rubber Tired Roller	D	3
15 Cubic meter Asphalt Belly Dump Trucks	D	25
Misc:		
Concrete Paver	D	1
IR 175 Air Compressors	G	20
10 HP Generators	G	30
Hand Operated Vibraplate compactors	G	25
Self Propelled Trench Compactors	G	10
Trencher – 150 mm width	G	3
Concrete Saw – Hand held (2 hp)	G	15
Concrete Saw – Tire mounted (6 hp)	G	2
Concrete Pavement Breaker	D	2
1/2 ton Traffic Control Truck	G	3
Stake Bed Traffic Control Truck	G	2
Tandem Traffic Control Truck with Attenuator	D	2
Street Sweeper	G	3

Assumptions:

Construction Duration: 39 Months
Normal Work Hours: 8 hrs/day @ 5 days per week
Double Shift: Not Required

Earthwork Quantities: 12,770,530 cm (Embankment)
11,837,000 cm (Remedial Grading)
291,890 cm (Export)

Minimal Demolition Required
Direct Connection to the I-5

4.1.1 METHODOLOGY

Construction emission rates for large development projects have been estimated by the U.S. Environmental Protection Agency. According to the SCAQMD's 1993 CEQA Air Quality Handbook, the emission factor for disturbed soil is 0.40 tons of PM10 per month per acre. If water or other soil stabilizers are used to control dust as required by SCAQMD Rule 403, the emissions can be reduced by 50 percent.

PM10 emission rates for loading of material onto trucks (i.e. dirt, sand and gravel) were obtained from the SCAQMD's 1993 CEQA Air Quality Handbook. The emission rate depends on the amount of materials being handled from import/export activities, the moisture content of the materials and the mean wind speed. For this project, it was assumed that excavated dirt had a 15% moisture content. The wind speed was assumed to be 12 mph. These assumptions were based on the CEQA Handbook, Page A9-101.

Typical emission rates for construction equipment were obtained from the 1993 CEQA Air Quality Handbook. These emission factors are presented in terms of pounds of pollutant per hour of equipment operation. It should be noted that most of these emission factors were initially published in 1985 in the EPA's AP-42 Compilation of Emission Factors.

Emission rates for employee vehicle trips and heavy truck operations were taken from EMFAC2000. EMFAC2000 is a computer program generated by the California Air Resources Board that calculates composite emission rates for vehicles. Emission rates are reported by the program in grams per trip and grams per mile. Using the estimates presented above, the peak construction emissions were calculated and are presented in the next section. (The data used to calculate the construction emissions are available for viewing at the TCA office.)

4.1.2 RESULTS

The construction emissions for the eight scenarios are summarized in Tables 4-15 through 4-28. For all scenarios, construction equipment produce the greatest amount of emissions for all of the criterion pollutants. Grading activities also generate a significant amount of PM10 while emissions from employee travel; import/export activities and demolition are secondary.

Table 4-15
CONSTRUCTION EMISSIONS (Pounds/Day) – INITIAL FEC

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	33,044.0	1,357.0	6,841.9	524.9	788.4
2	EMPLOYEE TRAVEL	494.9	32.3	61.4	3.9	3.1
3	GRADING (PM10)	-	-	-	-	422.4
4	IMPORT/EXPORT (PM10)	-	-	-	-	1.7
5	DEMOLITION DEBRIS	-	-	-	-	49.0
	GRAND TOTAL:	**33,539**	**1,389**	**6,903**	**529**	**1,265**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-16
CONSTRUCTION EMISSIONS (Pounds/Day) – INITIAL A7C

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	39,718.5	1,823.1	11,450.8	966.6	1,354.9
2	EMPLOYEE TRAVEL	607.4	39.7	75.3	4.8	3.9
3	GRADING (PM10)	-	-	-	-	844.8
4	IMPORT/EXPORT (PM10)	-	-	-	-	2.3
5	DEMOLITION DEBRIS	-	-	-	-	68.6
	GRAND TOTAL:	**<u>40,326</u>**	**<u>1,863</u>**	**<u>11,526</u>**	**<u>971</u>**	**<u>2,274</u>**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-17
CONSTRUCTION EMISSIONS (Pounds/Day) – INITIAL CC

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	37,967.1	1,706.0	7,686.9	716.9	896.2
2	EMPLOYEE TRAVEL	543.5	35.5	67.4	4.3	3.4
3	GRADING (PM10)	-	-	-	-	594.0
4	IMPORT/EXPORT (PM10)	-	-	-	-	2.0
5	DEMOLITION DEBRIS	-	-	-	-	57.9
	GRAND TOTAL:	**38,511**	**1,741**	**7,754**	**721**	**1,554**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-18
CONSTRUCTION EMISSIONS (Pounds/Day) – ULTIMATE FEC

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	34,835.1	1,461.5	7,258.0	623.3	869.3
2	EMPLOYEE TRAVEL	497.6	32.5	61.7	3.9	3.2
3	GRADING (PM10)	-	-	-	-	475.2
4	IMPORT/EXPORT (PM10)	-	-	-	-	1.1
5	DEMOLITION DEBRIS	-	-	-	-	0.0
	GRAND TOTAL:	**35,333**	**1,494**	**7,320**	**627**	**1,349**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-19
CONSTRUCTION EMISSIONS (Pounds/Day) – ULTIMATE A7C

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	26,505.6	1,496.4	14,381.8	1,150.0	1,694.2
2	EMPLOYEE TRAVEL	686.7	44.9	85.1	5.4	4.4
3	GRADING (PM10)	-	-	-	-	871.2
4	IMPORT/EXPORT (PM10)	-	-	-	-	4.9
5	DEMOLITION DEBRIS	-	-	-	-	40.6
	GRAND TOTAL:	**27,192**	**1,541**	**14,467**	**1,155**	**2,615**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-20
CONSTRUCTION EMISSIONS (Pounds/Day) – ULTIMATE CC

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	38,510.3	1,771.8	8,299.8	765.7	952.0
2	EMPLOYEE TRAVEL	598.4	39.1	74.2	4.7	3.8
3	GRADING (PM10)	-	-	-	-	607.2
4	IMPORT/EXPORT (PM10)	-	-	-	-	3.3
5	DEMOLITION DEBRIS	-	-	-	-	45.5
	GRAND TOTAL:	**39,109**	**1,811**	**8,374**	**770**	**1,612**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-21
CONSTRUCTION EMISSIONS (Pounds/Day) – AIO

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	18,849.7	849.2	5,523.9	402.4	595.8
2	EMPLOYEE TRAVEL	289.8	18.9	35.9	2.3	1.8
3	GRADING (PM10)	-	-	-	-	105.6
4	IMPORT/EXPORT (PM10)	-	-	-	-	0.4
5	DEMOLITION DEBRIS	-	-	-	-	23.5
	TOTAL:	**19,139**	**868**	**5,560**	**405**	**727**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-22
CONSTRUCTION EMISSIONS (Pounds/Day) – I-5W

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	45,172.4	2,026.2	13,180.6	910.2	1,403.3
2	EMPLOYEE TRAVEL	651.2	42.6	80.7	5.1	0.1
3	GRADING (PM10)	-	-	-	-	145.2
4	IMPORT/EXPORT (PM10)	0.0	0.0	0.0	0.0	3.4
5	DEMOLITION DEBRIS	-	-	-	-	130.7
	TOTAL:	**45,824**	**2,069**	**13,261**	**915**	**1,683**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-23
CONSTRUCTION EMISSIONS (Pounds/Day) – Ultimate A7C-FEC-M

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	27,846.1	1,230.1	6,964.5	542.9	774.9
2	EMPLOYEE TRAVEL	478.9	31.3	59.4	3.8	3.0
3	GRADING (PM10)	-	-	-	-	330.0
4	IMPORT/EXPORT (PM10)	-	-	-	-	2.3
5	DEMOLITION DEBRIS	-	-	-	-	-
	TOTAL:	**28,325**	**1,261**	**7,024**	**547**	**1,110**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-24
CONSTRUCTION EMISSIONS (Pounds/Day) – Ultimate FEC-M

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	30,509.6	1,348.9	7,310.0	601.7	851.2
2	EMPLOYEE TRAVEL	499.0	32.6	61.9	3.9	3.2
3	GRADING (PM10)	-	-	-	-	330.0
4	IMPORT/EXPORT (PM10)	-	-	-	-	2.1
5	DEMOLITION DEBRIS	-	-	-	-	-
	TOTAL:	**31,009**	**1,382**	**7,372**	**606**	**1,187**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-25
CONSTRUCTION EMISSIONS (Pounds/Day) – Ultimate FEC-W

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	29,783.2	1,280.4	6,233.3	530.6	740.1
2	EMPLOYEE TRAVEL	468.4	30.6	58.1	3.7	3.0
3	GRADING (PM10)	-	-	-	-	330.0
4	IMPORT/EXPORT (PM10)	-	-	-	-	0.9
5	DEMOLITION DEBRIS	-	-	-	-	-
	TOTAL:	**30,252**	**1,311**	**6,291**	**534**	**1,074**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-26
CONSTRUCTION EMISSIONS (Pounds/Day) – Initial A7C-FEC-M

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	27,432.0	1,176.3	5,982.4	479.0	672.1
2	EMPLOYEE TRAVEL	435.8	28.5	54.0	3.4	2.8
3	GRADING (PM10)	-	-	-	-	330.0
4	IMPORT/EXPORT (PM10)	-	-	-	-	1.5
5	DEMOLITION DEBRIS	-	-	-	-	-
	TOTAL:	**27,868**	**1,205**	**6,036**	**482**	**1,006**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-27
CONSTRUCTION EMISSIONS (Pounds/Day) – Initial FEC-M

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	29,156.8	1,211.0	5,134.6	444.9	608.2
2	EMPLOYEE TRAVEL	484.4	31.7	60.1	3.8	3.1
3	GRADING (PM10)	-	-	-	-	330.0
4	IMPORT/EXPORT (PM10)	-	-	-	-	2.5
5	DEMOLITION DEBRIS	-	-	-	-	-
	TOTAL:	**29,641**	**1,243**	**5,195**	**449**	**944**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

Table 4-28
CONSTRUCTION EMISSIONS (Pounds/Day) – Initial FEC-W

		CO	ROG	NOx	SOx	PM10
1	CONSTRUCTION EQUIPMENT	29,353.8	1,235.9	5,601.9	474.9	657.6
2	EMPLOYEE TRAVEL	438.6	28.7	54.4	3.4	2.8
3	GRADING (PM10)	-	-	-	-	330.0
4	IMPORT/EXPORT (PM10)	-	-	-	-	0.3
5	DEMOLITION DEBRIS	-	-	-	-	-
	TOTAL:	**29,792**	**1,265**	**5,656**	**478**	**991**
	Significance Thresholds (pounds/day)					
	Pounds per Day	*550*	*75*	*100*	*150*	*150*

NOTE: The underlined data indicate exceedance of the significance thresholds.

In general, the *I-5W* scenario generates the greatest amount of emissions while the ultimate *AIO* scenario generates the least amount of emissions. These emissions are mostly generated by the large number of construction equipment operated on a worst case peak day.

For all scenarios, CO, ROG, NOx, and PM10 emissions exceed the thresholds. The greatest levels of air pollution emissions occur during peak periods of construction which are most likely the demolition, grading and site preparation operating simultaneously. Specifically, construction equipment produce most of the CO, ROG, NOx, SOx and PM10 emissions. Grading activities also generate a significant amount of PM10. For the SOCTIIP, the peak PM10 emissions (727 - 2,615 pounds per day) are minor when compared with the total average annual of 416 tons per day (832,000 pounds per day) of particulate matter currently released in the whole South Coast Air Basin (SCAB). However, according to the SCAQMD's CEQA Handbook, PM10 emissions greater than 150 pounds per day should be considered significant.

The emissions generated by the construction of the SOCTIIP are projected to exceed the thresholds for all pollutants. The thresholds are intended to be set at the lowest levels for which air quality impacts may occur. The fact that they are projected to exceed the thresholds implies that there will be increases in the concentrations of these pollutants that would be measurable. For example, the state PM10 standards are exceeded in the study area, and slight increases in the concentrations of PM10 may occur. The federal PM10 standard is not exceeded in the area, and it is not anticipated that the quantities of pollutants released would be so great as to cause a violation of the federal standards. The increases would be local to the construction activities and would be temporary. However, the increases in pollutant concentrations are not a federal conformity issue. It would only become an issue if there were construction in one location over a five year period (40 CFR 93-123), and this will not be the situation. Mitigation measures are recommended to the greatest extent possible. The mitigation measures recommended for construction activities are listed in Section 6.1.

4.2 LOCAL AIR QUALITY IMPACTS

Because the SOCTIIP alternatives will change the traffic pattern of the road system in the south Orange County, a detailed analysis of CO concentrations at sensitive areas in the project vicinity is warranted. The build alternatives have the potential to alter traffic patterns on arterial roads as well as adding a new source of air pollutants. Therefore, both concentrations at key arterial intersections as well as concentrations along the corridor alignments were investigated.

PM10 is also evaluated in a qualitative manner per FHWA guidelines. This analysis is presented in Section 4.2.7 – Qualitative PM10 Hot Spot Analysis.

4.2.1 METHODOLOGY

Local air quality impacts can be assessed by comparing future CO levels with state and federal AAQS presented previously in Section 3.7.

All the intersections modeled in the impact assessment were modeled for the future setting. EPA guidance suggests modeling the top three intersections in the area based on the highest traffic volume and the top three intersections based on the worst traffic level of service (LOS). This report analyzes up to 14 worst case intersections. For each of the six primary SOCTIIP build alternatives, all of the 14 key intersections or as many as are present for that specific alternative were evaluated. For example, the FEC may intersect with Vista Hermosa, but this intersection would not exist with the AIO or I-5 alternatives. The 14 common intersections are distributed throughout the SOCTIIP study area, and provide for a direct comparison of local air quality impacts among the alternatives.

In general, the "Transportation Project-Level Carbon Monoxide Protocol" (University of California at Davis, December 1997) was followed for the local air quality assessment. This document, commonly referred to as the Caltrans Protocol, was developed for use by Caltrans. The CALINE4 modeling methodologies were based on the Caltrans Protocol Sections B.4.3 through B.5.1. Worst case meteorology recommended in Table B.11 was utilized for the modeling of the 1-hour CO concentrations. For worst case meteorological conditions, a late afternoon winter period with a ground based inversion was considered. A wind speed of 0.5 meter per second (one mile per hour) and a stability class G was utilized for a 1-hour averaging time. A worst-case wind direction for each site was determined by the CALINE4 model. A sigma theta of 10 degrees was used in the modeling, and is recommended by Caltrans for this area. The sigma theta modeling input represents the fluctuation of wind direction. A high sigma theta number would represent a very changeable wind direction, in other words, a wind that oscillates widely. A very steady, consistent wind would have a low sigma theta value. The temperature used for worst case was 10 degrees Centigrade (50 degrees Fahrenheit). Temperature affects the dispersion pattern and emission rates of motor vehicles. The temperature represents the January mean minimum temperature as reported by Caltrans. A mixing height of 1,000 meters (3,281 feet) was used as recommended in the CALINE4 Manual. A surface roughness of the ground in the area of 100 centimeters (39 inches) was used and is based on the CALINE4 Manual. The model results are also dependent on the speeds of the vehicles used in the model.

Emission factors for the arterials used with the CALINE4 model were computed using the EMFAC Model developed by the CARB. The emission factors version EMFAC7F1.1 was used for the CALINE4 modeling. Use of these factors is suggested in the Caltrans Protocol (Page B-2) and was confirmed as being appropriate with the CARB. Discussions in April 2001, when the analysis was initiated, with Mr. Doug Thompson of CARB indicate that EMFAC7F should be used for the local air analysis. This approach is confirmed in a letter from Mr. David Howekamp, Director, Air Quality Management Division of the United States Environmental Protection Agency (letter addressed to Mr. Michael Kenny of the California Environmental Protection Agency, dated April 16, 1998).

The CALINE4 model projects 1-hour concentrations. To obtain 8-hour or 24-hour concentrations, a persistence factor is used. The method essentially uses a persistence factor that is multiplied times the 1-hour emission projections. The ambient concentration is then added to this product. The persistence factor can be estimated using the highest ratio of 8-hour to 1-hour second annual maximum CO concentrations from the most recent three years of available data. The persistence factors recommended in the Caltrans Protocol (Table B.15) were utilized. For 8-hour CO, a persistence factor of 0.7 was used for local arterial intersections and a persistence factor of 0.8 was used for freeway intersections. (The computer printouts of the CALINE4 modeling are available for review at the TCA office.)

The projected background CO concentrations were obtained from the SCAQMD website (www.aqmd.gov/ceqa/hndbh.html) accessed on November 25, 2002. Projected background concentrations are available for years 1999 to 2020. However, according to CEQA, the projected 2000 background CO concentrations were significantly lower than the actual monitoring data. Therefore, in order to compensate for this discrepancy, the future (2008, 2018 and 2025) background CO concentrations were adjusted by interpolation. The adjustment was based on the highest reading at the Mission Viejo/El Toro air quality monitoring station (4.3 ppm for 1 hour, and 3.1 ppm for 8 hour) multiply by the ratio of the CEQA Handbook's future (2010-2020) versus 2000 background concentrations. The results became the future background CO concentrations for 2010-2020, which are projected to be the same. We assumed that these same background levels would continue through year 2025. Therefore, the 2018 and 2025 background CO concentrations are projected to be 3.3 ppm for 1-hour and 2.3 ppm for 8-hour. Therefore, 3.3 ppm is added to the worst case meteorological 1-hour projections and 2.3 ppm is added to the worst case 8-hour projections to account for the future background CO levels. For 2008, the background CO concentration levels were interpolated, and the CO levels are projected to be 3.4 ppm for 1-hour and 2.4 ppm for 8-hour.

The future peak hour traffic and volume/capacity (V/C) ratio data are from the Traffic and Circulation Technical Report prepared by Austin Foust and Associates. The PM peak hour traffic data is used for the CALINE4 computer modeling as the worst case alternative, because the PM peak hour traffic volumes are higher than the AM peak hour volumes. The V/C ratio is also known as the LOS at an intersection. The LOS determines the congestion levels at the intersections, and therefore, is important in the CALINE4 modeling. The LOS determines the average speed used at an intersection. For CO, speeds lower than 40 mph result in higher emission rates. Very slow speeds (e.g., 10 mph) result in substantially higher emissions than moderate speeds (e.g., 30 to 40 mph). As a result, higher congestion levels result in slower speeds which result in higher CO concentrations.

The air quality impacts will be assessed for six primary buildout (2025) alternatives. The six primary 2025 alternatives are: No Action, Far East Corridor-Complete (FEC), Central Corridor-Complete (CC), Alignment 7 Corridor-Complete (A7C), Arterial Improvements Only (AIO), and I-5 Widening (I-5). Speed sensitivity runs will also be analyzed for the 2025 FEC, 2025 AIO and 2025 I-5 in order to test how sensitive CO levels are relative to the different speeds used on the roadways. In addition, CALINE4 modeling will be assessed for the worst case intersections for the opening (2008) year and for 2018 (10 year increment). Additionally, CALINE4 modeling will be assessed for three special alternatives: FEC toll-free, CC toll-free and A7C toll-free. All these alternatives are based on the buildout of the MPAH and the 2001 Regional Transportation Plan (RTP) Update. These alternatives assume the buildout road network with OCP-2000 growth projections of 21,000 RMV DU.

Up to 14 key intersections were selected for analysis. These key intersections are I-5/Alicia Parkway, Felipe/Oso Parkway, Antonio Parkway/Oso Parkway, SR 241/Oso Parkway, Crown Valley Parkway/Marguerite, I-5/Ortega Highway, I-5/Vista Hermosa, Antonio Parkway/Ortega Highway, Avenida Pico/La Pata, I-5/El Camino Real, I-5/Avenida Pico, Antonio Parkway/Crown Valley Parkway, Vista Hermosa/La Pata and SR 241/Avenida Pico. It should be noted that the future Vista Hermosa/La Pata and/or SR 241/Avenida Pico intersections would only occur for the No Action, FEC and A7C alternatives. Maps, plans or aerial photographs were used to determine the geometry of the intersection or interchange. The roadways were divided into links that represent the geometry of the intersection or interchange and entered into the CALINE4 model.

For each intersection, the CO modeling was assessed for four receptors, one at each corner of the intersection, and the highest CO concentration levels are presented. Each receptor is located approximately 25 feet (8 meters) from the corner of the intersection or at the nearest existing land use.

4.2.2 FAR EAST CORRIDOR ALTERNATIVES

The analysis presented in this subsection focuses on the Far East Corridor-Complete (FEC) alternative in the initial configuration. However, the results presented should be considered representative for all the Far East Corridor alternatives including the Far East Corridor Talega Variation (FEC-TV), the Far East Corridor Cristianitos Variation (FEC-CV), the Far East Corridor Highway Variation (FEC-OHV), the Far East Corridor-West (FEC-W), Far East Corridor-Modified (FEC-M), the Alignment 7 Corridor-Far East Crossover-Modified (A7C-FEC-M) and the Far East Corridor Avenida Pico Variation (FEC-APV) alternatives because the results of the traffic effects are similar.

The results of the CO modeling for the FEC-Initial alternative are summarized in Table 4-29 for 1-hour and 8-hour concentrations for CO. The pollutant levels are expressed in ppm for CO. The CO levels are the composites of the background levels of CO coming into the area plus those generated by the local roadways. The receptor locations are shown in Figure 4-1.

TABLE 4-29
FAR EAST COMPLETE, CO PROJECTIONS - 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

Site	INTERSECTION	2025 CARBON MONOXIDE EXISTING 1-hr/8-hr	NO ACTION 1-hr/8-hr	Scenario 8 FEC 1-hr/8-hr
1	I-5/Alicia Parkway	8.5 / 6.5	5.6 / 4.1	5.3 / 3.9
2	Felipe/Oso Parkway	8.0 / 5.7	8.0 / 5.6	8.0 / 5.6
3	Antonio Pkwy./Oso Pkwy.	6.2 / 4.4	6.9 / 4.8	6.8 / 4.8
4	SR-241/Oso Parkway	4.9 / 3.6	3.7 / 2.6	3.7 / 2.6
5	Crown Valley/Marguerite	8.6 / 6.1	12.0 / 8.4	11.7 / 8.2
6	I-5/Ortega Highway	7.6 / 5.7	6.0 / 4.5	5.7 / 4.2
7	Antonio Pkwy./Ortega Hwy.	5.5 / 3.9	6.9 / 4.8	6.0 / 4.2
8	I-5/Vista Hermosa	5.7 / 4.2	4.9 / 3.6	4.7 / 3.4
9	Ave. Pico/La Pata	4.7 / 3.4	6.3 / 4.4	4.6 / 3.2
10	I-5/El Camino Real	6.5 / 4.9	5.4 / 4.0	5.1 / 3.7
11	I-5/Ave. Pico	9.1 / 6.9	6.2 / 4.6	6.1 / 4.5
12	Antonio Pkwy./Crown Valley	5.1 / 3.7	6.9 / 5.2	6.8 / 5.1
13	Vista Hermosa/La Pata	-	5.3 / 3.7	4.3 / 3.0
14	SR-241/Ave. Pico	-	-	4.2 / 3.0
	State Standards:	20 ppm/ 9 ppm	20 ppm/ 9 ppm	20 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0
	Federal Standards:	35 ppm/ 9 ppm	35 ppm/ 9 ppm	35 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0

The CO modeling results for the existing, 2025 No Action and 2025 FEC alternatives are presented in Table 4-29. For the CO concentration levels, the pollutant levels are projected to comply with the state and federal CO AAQS for both 1-hour and 8-hour time frames at all receptor locations for all three alternatives.

The results show that the existing CO concentration levels are the highest of the three alternatives at a number of intersections while the 2025 FEC CO levels are the lowest.

The existing CO levels are the highest at Intersections 1, 2, 4, 6, 7, 10 and 11 with most of these locations being next to I-5. Existing concentrations are higher primarily due to the higher existing background CO concentration levels and the higher existing emission rates. The amount of existing peak hour traffic is actually lower than the two future alternatives, but is offset by the higher existing background CO and emission rates. In contrast, the existing CO levels are the lowest at Intersections 3, 5, 8 and 12. This is indicative of the fairly low existing local traffic conditions in these areas in comparison to the future alternatives. Of the two future alternatives, the 2025 No Action alternative CO concentration levels are slightly higher than the 2025 FEC alternative CO concentration levels. This is a result of the higher amount of peak hour traffic and higher congestion level associated with the 2025 No Action alternative. On the other hand, the 2025 FEC alternative shows overall improvement in CO concentration levels with the implementation of the project. That is, lower CO levels will result at most of these intersections. This is due to lower peak hour traffic and reduced congestion level associated with the 2025 FEC alternative. The 2025 No Action CO levels are the highest and represent the worst-case alternative.

There are no receptors at Ortega Highway and the FEC interchange for two reasons. Receptor 4 is located at Oso Parkway and FEC, and both the FEC and Oso Parkway have higher traffic volumes than does the FEC and Ortega Highway. Second, any potential impacts are bracketed by the results for Receptor 4 (FEC at Oso Parkway) and Receptor 14 (FEC at Pico).

4.2.2.1 Interim Year Comparison

For comparison purposes, two special alternatives, opening year 2008 and ten-year increment 2018, with and without the project, were analyzed for the worst case intersection. The purpose of this analysis is to determine whether 2025 will have the highest air pollutant concentrations or whether an intermediate year will result in the highest concentrations. For this alternative, the worst case intersection is Crown Valley Parkway/Marguerite (Site 5). The worst case intersection has the highest CO concentration for the 2025 FEC alternative. The CO modeling results of these two special alternatives are shown in Table 4-30

Table 4-30
CO (PPM) PROJECTIONS FOR 2025 FEC VERSUS INTERIM YEAR ALTERNATIVES

		INTERIM YEARS				
		2008		**2018**		**2025**
Site	**INTERSECTION**	**NO ACTION** 1-hr/8-hr	**Scenario 8 FEC** 1-hr/8-hr	**NO ACTION** 1-hr/8-hr	**Scenario 8 FEC** 1-hr/8-hr	**Scenario 8 FEC** 1-hr/8-hr
5	Crown Valley/Marguerite	7.1 / 5.0	7.1 / 5.0	8.2 / 5.7	7.9 / 5.5	11.7 / 8.2

Of the three future alternatives, the CO concentration levels for the 2008 alternatives are the lowest while the 2025 FEC alternatives are the highest. The emission factors are gradually decreasing, and the traffic levels are gradually increasing over this time period. Since the highest concentration occurs in the Year 2025 this is clearly the worst case year. The 2008 CO levels with and without the project are the same, however, the CO levels for 2018 FEC are lower than 2018 No Action. This shows an overall improvement in terms of traffic and congestion level associated with the 2018 FEC. The 2025 FEC CO levels are the highest and represent the worst case buildout alternative. In summary, the 2025 combination of traffic forecasts and emission rates results in the highest concentrations, and the intermediate years will have lower CO concentrations local to critical intersections.

4.2.2.2 Toll versus Toll-free Comparison

A toll versus toll-free sensitivity analysis was conducted. Making the proposed transportation corridor toll-free would increase traffic volumes on the corridor and change travel patterns correspondingly on the arterial roadway network. This analysis examines the toll-free effects on the worst case intersection (i.e., Crown Valley Parkway and Marguerite Parkway) and the interchange along the corridor with the highest projected concentration (i.e., SR 241 and Avenida Pico).

The CO concentration levels for 2025 FEC Toll-free with and without the project were assessed and the results are presented in Table 4-31.

Table 4-31
CO (PPM) PROJECTIONS FOR 2025 FEC VERSUS FEC TOLL-FREE ALTERNATIVES

Site	INTERSECTION	TOLL-FREE ALTERNATIVE 2025 NO ACTION 1-hr/8-hr	TOLL-FREE ALTERNATIVE 2025 Scenario 41 FEC 1-hr/8-hr	2025 Scenario 8 FEC 1-hr/8-hr
5	Crown Valley/Marguerite	12.0 / 8.4	7.8 / 4.5	11.7 / 8.2
14	SR 241/Ave. Pico	-	4.2 / 3.0	4.2 / 3.0

The CO concentration levels for the 2025 FEC toll-free are the lowest while the 2025 No Action are the highest. The 2025 FEC toll-free shows an overall improvement when compared to 2025 No Action. This is as a result of improved local traffic conditions in terms of lower traffic on arterials and reduced congestion level associated with the implementation of the 2025 FEC Toll-free. The 2025 No Action CO concentration levels are higher than 2025 FEC and represent the worst-case alternative.

4.2.2.3 Speed Sensitivity Along Corridor

The effects of varying speeds on the transportation corridor were investigated for the 2025 FEC. CO modeling was assessed for three speeds at two critical receptors along the proposed transportation corridor. For this alternative, speeds of 55, 60 and 65 miles per hour (mph) were assessed. Higher speeds could not be assessed because emission rates are available only for speeds of 65 mph or less (EMFAC7F does not include emission rates for speeds greater than 65 mph). The 1-hour and 8-hour CO concentration results are shown in Table 4-32. The speeds are presented in mph and kilometers per hour (km/h).

Table 4-32
CO (PPM) PROJECTIONS FOR THE SPEED SENSITIVITY RUNS

Site	INTERSECTION	2025 **FEC 55 mph (93 km/h)** 1-hr/8-hr	2025 **FEC 60 mph (102 km/h)** 1-hr/8-hr	2025 **FEC 65 mph (110 km/h)** 1-hr/8-hr
4	SR 241/Oso Parkway	3.6 / 2.5	3.6 / 2.5	3.8 / 2.7
14	SR 241/Avenida Pico	3.8 / 2.7	3.9 / 2.8	4.2 / 3.0

The results indicate that the CO concentration levels at 60 mph are slightly higher than at 55 mph at Receptor 14, and CO concentrations at 65 mph are the highest of the three speeds for both receptors. This is primarily due to the steady rise in the emission rates at 60 and 65 mph. In fact, the emission rate curve shows a dramatic increase for the speed of 65 mph or greater. The 65 mph is most representative of the typical speed on SR 241.

4.2.2.4 Ultimate Corridor Configuration

CO modeling was assessed for the ultimate corridor configuration at the two corridor intersections (Table 4-33). The ultimate configuration proposes an 8-lane transportation corridor from Oso Parkway to I-5. It should be noted that the ultimate configuration is equivalent to a toll-free alternative but is not expected to occur before 2025. However, traffic volumes were only available up to 2025. For this report, 2025 traffic volumes will be utilized for the ultimate corridor configuration.

Table 4-33
CO (PPM) PROJECTIONS FOR THE FEC ULTIMATE CONFIGURATION

Site	INTERSECTION	2025 Scenario 5 NO ACTION 1-hr/8-hr	2025 INITIAL CONFIG. Scenario 8 FEC 1-hr/8-hr	2025 ULTIMATE CONFIG. TOLL-FREE Scenario 41 FEC 1-hr/8-hr
4	SR 241/Oso Parkway	3.7 / 2.6	3.7 / 2.6	3.7 / 2.6
14	SR 241/Avenida Pico	-	4.2 / 3.0	4.2 / 3.0

The results indicate that the CO concentration levels are the same for all three future alternatives at the two corridor intersections. The 2025 No Action actually has the lowest traffic volumes at these two intersections while the toll-free (ultimate configuration) has the highest traffic volumes. However, the increase in traffic with the implementation of the corridor is not large enough to result in a local air quality impact. The increase in CO levels with the corridor alternatives is not perceptible.

4.2.3 CENTRAL CORRIDOR ALTERNATIVES

The analysis presented in this subsection focuses on the Central Corridor-Complete (CC) alternative in the initial configuration. However, the results presented should be considered representative also for the Central Corridor Avenida La Pata Variation (CC-ALPV), and the Central Corridor Ortega Highway Variation (CC-OHV) alternatives because the forecasts of the traffic effects are similar.

The results of the CALINE4 modeling for the Central Corridor (CC) alternatives are summarized in Table 4-34 for 1-hour and 8-hour concentrations for CO. The pollutant levels are expressed in ppm for CO. The CO levels are the composites of the background levels of CO coming into the area plus those generated by the local roadways. The receptor locations are shown in Figure 4-2.

Table 4-34
CENTRAL CORRIDOR, CO AND PM10 PROJECTIONS - 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

		2025 CARBON MONOXIDE		
	INTERSECTION	**EXISTING** 1-hr/8-hr	**NO ACTION** 1-hr/8-hr	**Scenario 20 CC** 1-hr/8-hr
1	I-5/Alicia Parkway	8.5 / 6.5	5.6 / 4.1	5.3 / 3.9
2	Felipe/Oso Parkway	8.0 / 5.7	8.0 / 5.6	8.0 / 5.6
3	Antonio Pkwy./Oso Pkwy.	6.2 / 4.4	6.9 / 4.8	6.7 / 4.7
4	SR-241/Oso Parkway	4.9 / 3.6	3.7 / 2.6	3.7 / 2.6
5	Crown Valley/Marguerite	8.6 / 6.1	12.0 / 8.4	7.8 / 5.5
6	I-5/Ortega Highway	7.6 / 5.7	6.0 / 4.5	5.7 / 4.2
7	Antonio Pkwy./Ortega Hwy.	5.5 / 3.9	6.9 / 4.8	5.8 / 4.1
8	I-5/Vista Hermosa	5.7 / 4.2	4.9 / 3.6	4.5 / 3.3
9	Ave. Pico/La Pata	4.7 / 3.4	6.3 / 4.4	4.9 / 3.4
10	I-5/El Camino Real	6.5 / 4.9	5.4 / 4.0	5.5 / 4.1
11	I-5/Ave. Pico	9.1 / 6.9	6.2 / 4.6	4.7 / 3.4
12	Antonio Pkwy./Crown Valley	5.1 / 3.7	6.9 / 5.2	6.8 / 4.8
13	Vista Hermosa/La Pata	-	5.3 / 3.7	-
	State Standards:	20 ppm/ 9 ppm	20 ppm/ 9 ppm	20 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0
	Federal Standards:	35 ppm/ 9 ppm	35 ppm/ 9 ppm	35 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0

The CO modeling results for the existing, 2025 No Action and 2025 CC alternatives are presented in Table 4-34. For the CO concentration levels, the pollutant levels are projected to comply with the state and federal CO AAQS for both 1-hour and 8-hour time frames at all receptor locations for all three alternatives.

The existing CO concentration levels are the highest of the three alternatives at a number of intersections while the 2025 CC CO levels are the lowest. The existing CO levels are the highest at Intersections 1, 2, 4, 6, 8, 10 and 11 with most of these locations being next to I-5. Existing concentrations are higher primarily due to the higher existing background CO concentration levels and emission factors. The amount of existing traffic is actually lower than the two future alternatives but is offset by the higher existing background CO and emission rates. In contrast, the existing CO levels are the lowest at Intersections 3, 7, 9 and 12. This is indicative of the better existing local traffic conditions in these areas in comparison to the future alternatives. Of the two future alternatives, the 2025 CC CO concentration levels are slightly lower than the 2025 No Action CO concentration levels, and thus result in an overall improvement in air quality. The improvement is primarily due to lower peak traffic and reduced congestion level associated with the 2025 CC. Hence, lower CO levels will result at most of these intersections. On the other hand, the 2025 No Action CO levels are the highest and represent the worst-case alternative.

For comparison purposes, two special alternatives, opening year 2008 and ten-year increment 2018, with and without the project were analyzed for the worst case intersection. The worst case intersection has the highest level of CO concentration for the 2025 CC. For this alternative, the worst case intersection is Felipe/Oso Parkway (Site 2). The CO modeling results of the two special alternatives are shown in Table 4-35.

Table 4-35
CO (PPM) PROJECTIONS FOR 2025 CC VERSUS INTERIM YEAR ALTERNATIVES

		INTERIM YEARS				
		Year 2008		**Year 2018**		**Year 2025**
		NO ACTION	Scenario 20 CC	NO ACTION	Scenario 20 CC	Scenario 20 CC
Site	INTERSECTION	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr
2	Felipe/Oso Parkway	6.8 / 4.8	6.8 / 4.8	7.8 / 5.5	7.6 /5.3	**8.0 / 5.6**

The CO concentration levels for the 2008 alternatives are the lowest while the 2025 CC alternatives are the highest. The emission factors are gradually decreasing, and the traffic levels are gradually increasing over this time period. Since the highest concentration occurs in the Year 2025 this is clearly the worst case year. The 2008 CO levels with and without the project are the same, however, the CO concentration levels for 2018 CC are slightly less than 2018 No Action. This is a result of the lower peak traffic and congestion level, and as a result reduced CO concentration levels for the 2018 CC. The 2025 CC CO levels are the highest and represent the worst case buildout alternative.

The CO concentration levels for the 2025 CC Toll-free with and without the project were assessed and the results are presented in Table 4-36.

Table 4-36
CO (PPM) PROJECTIONS FOR THE CC VERSUS CC TOLL-FREE

Site	INTERSECTION	TOLL-FREE ALTERNATIVE **2025** NO ACTION 1-hr/8-hr	TOLL-FREE ALTERNATIVE **2025** Scenario 42 CC 1-hr/8-hr	**2025** Scenario 20 CC 1-hr/8-hr
2	Felipe/Oso Parkway	8.0 / 5.6	7.8 / 5.5	**8.0 / 5.6**

The CO concentration levels for 2025 CC Toll-free are the lowest of the three alternatives. The 2025 CC Toll-free shows an overall improvement when compared to both 2025 No Action and 2025 CC. This is indicative of the better local traffic condition in terms of lower peak traffic and congestion level associated with the 2025 CC Toll-free alternative. The CO concentration levels for the 2025 No Action and the buildout 2025 CC are the same. The 2025 CC actually has slightly lower peak traffic volumes compared to the 2025 No Action. However, the difference in the CO concentration levels between these two alternatives is not perceptible.

4.2.3.1 Speed Sensitivity Along Corridor

The effects of varying speeds on the transportation corridor were investigated for the 2025 CC. CO modeling was assessed for three speeds at one receptor along the proposed transportation corridor. For this alternative, speeds of 55, 60 and 65 miles per hour (mph) were assessed. Higher speeds could not be assessed because emission rates are only available for speeds of 65 mph or less. The 1-hour and 8-hour CO concentration results are shown in Table 4-37. The speeds are presented in mph and km/h.

Table 4-37
CO (PPM) PROJECTIONS FOR THE SPEED SENSITIVITY RUNS

Site	INTERSECTION	2025 **CC** **55 mph** **(93 km/h)** 1-hr/8-hr	2025 **CC** **60 mph** **(102 km/h)** 1-hr/8-hr	2025 **CC** **65 mph** **(110 km/h)** 1-hr/8-hr
4	SR 241/Oso Parkway	3.6 / 2.5	3.6 / 2.5	3.8 / 2.7

The results indicate that the CO concentration levels are similar at the speeds of 55 and 60 mph but are slightly higher at the speed of 65 mph. The emission rate at 60 mph actually increased slightly over 55 mph but is not enough to effect the CO concentrations. Overall, the emission rate curve shows a dramatic increase for the speed of 65 mph or greater. The 65 mph is representative of the typical speed on SR 241.

4.2.3.2 Ultimate Configuration

CO modeling was assessed for the CC alternative ultimate configuration at the Oso Parkway/SR 241 corridor intersection (Table 4-38). The ultimate configuration proposes an 8-lane transportation corridor from Oso Parkway to I-5. It should be noted that the ultimate configuration is equivalent to a toll-free alternative but could only occur beyond 2025. However, traffic volumes were only available up to year 2025. For the purpose of this report, 2025 traffic volumes will be utilized for the ultimate configuration.

Table 4-38
CO (PPM) PROJECTIONS FOR THE CC ULTIMATE CONFIGURATION

Site	INTERSECTION	2025 Scenario 5 NO ACTION 1-hr/8-hr	2025 INITIAL CONFIG. Scenario 20 CC 1-hr/8-hr	2025 ULTIMATE CONFIG. TOLL-FREE Scenario 42 CC 1-hr/8-hr
4	SR 241/Oso Parkway	3.7 / 2.6	3.7 / 2.6	**3.7 / 2.6**

The results indicate that the CO concentration levels are the same for all three future alternatives. The toll-free (ultimate configuration) actually has the highest traffic volumes but the increase in traffic is not sufficient to have an impact on the local air quality.

4.2.4 ALIGNMENT 7 CORRIDOR ALTERNATIVES

The analysis presented in this subsection focuses on the Alignment 7 Corridor (A7C) alternative in the initial configuration. However, the results presented should also be considered representative for all of the Alignment 7 Corridor alternatives because the forecasts of the traffic effects are similar.

The results of the CO modeling for the A7C alternatives are summarized in Table 4-39 for 1-hour and 8-hour concentrations for CO. The pollutant levels are expressed in parts per million (ppm) for CO. The CO levels are composites of the background levels of CO coming into the area plus those generated by the local roadways. The receptor locations are presented in Figure 4-3.

TABLE 39
ALTERNATIVE 7 (A7C), CO AND PM10 PROJECTIONS FOR 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

		CARBON MONOXIDE		
	INTERSECTION	EXISTING 1-hr/8-hr	NO ACTION 1-hr/8-hr	Scenario 29 A7C 1-hr/8-hr
1	I-5/Alicia Parkway	8.5 / 6.5	5.6 / 4.1	5.3 / 3.9
2	Felipe/Oso Parkway	8.0 / 5.7	8.0 / 5.6	8.0 / 5.6
3	Antonio Pkwy./Oso Pkwy.	6.2 / 4.4	6.9 / 4.8	6.6 / 4.6
4	SR-241/Oso Parkway	4.9 / 3.6	3.7 / 2.6	3.6 / 2.5
5	Crown Valley/Marguerite	8.6 / 6.1	12.0 / 8.4	8.0 / 5.6
6	I-5/Ortega Highway	7.6 / 5.7	6.0 / 4.5	5.0 / 3.7
7	Antonio Pkwy./Ortega Hwy.	5.5 / 3.9	6.9 / 4.8	6.9 / 4.8
8	I-5/Vista Hermosa	5.7 / 4.2	4.9 / 3.6	4.7 / 3.4
9	Ave. Pico/La Pata	4.7 / 3.4	6.3 / 4.4	5.0 / 3.5
10	I-5/El Camino Real	6.5 / 4.9	5.4 / 4.0	5.0 / 3.7
11	I-5/Ave. Pico	9.1 / 6.9	6.2 / 4.6	5.6 / 4.1
12	Antonio Pkwy./Crown Valley	5.1 / 3.7	6.9 / 5.2	6.7 / 4.7
13	Vista Hermosa/La Pata	-	5.3 / 3.7	-
14	SR-241/Ave. Pico	-	-	4.3 / 3.1
	State Standards:	20 ppm/ 9 ppm	20 ppm/ 9 ppm	20 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0
	Federal Standards:	35 ppm/ 9 ppm	35 ppm/ 9 ppm	35 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0

The CO modeling results for the existing, 2025 No Action and 2025 A7C alternatives are presented in Table 4-39. For the CO concentration levels, the pollutant levels are projected to comply with the State and Federal CO AAQS for both 1-hour and 8-hour time frames at all receptor locations for all three alternatives.

The results show that the existing CO concentration levels are the highest of the three alternatives at a number of intersections while the 2025 A7C CO levels are the lowest. The existing CO levels are the highest at Intersections 1, 2, 4, 6, 8, 10 and 11 most of these being next to I-5. This is mainly due to the higher existing background CO concentration levels and emission factors. The amount of existing traffic is actually lower than the two future alternatives but is offset by the higher existing background CO and emission rates. In contrast, the existing CO levels are lowest at Intersections 3, 7, 9 and 12. This is indicative of the lower existing local traffic conditions in these areas when compared to the future alternatives. Of the two future alternatives, the 2025 No Action CO concentration levels are slightly higher than the 2025 A7C CO concentration levels. This is a result of the higher amount of traffic and slightly worse congestion level associated with the 2025 No Action alternative. On the other hand, the 2025 A7C alternative shows overall improvement in CO concentration levels when compared to the 2025 No Action. That is, lower CO levels will result at most of these intersections. This is due to lower peak hour traffic and reduced congestion level associated with the 2025 A7C alternative. The 2025 No Action CO levels are the highest and represent the worst-case alternative.

For comparison purposes, two special alternatives, opening year 2008 and ten-year increment 2018 with and without the project, were analyzed for the worst case intersection. The worst case intersection has the highest level of CO concentration for the 2025 A7C. For this alternative, the worst case intersection is Crown Valley Parkway/Marguerite (Site 5). The CO modeling results of these two special alternatives are shown in Table 4-40.

TABLE 4-40
CO (PPM) PROJECTIONS FOR 2025 A7C
VERSUS INTERIM YEAR ALTERNATIVES

		INTERIM YEARS				
		Year 2008		Year 2018		Year 2025
		NO ACTION	Scenario 29 A7	NO ACTION	Scenario 29 A7	Scenario 29 A7C
Site	INTERSECTION	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr
5	Crown Valley/Marguerite	7.1 / 5.0	6.2 / 4.4	8.2 / 5.7	8.0 / 5.6	8.0 / 5.6

The CO concentration levels for year 2008 alternatives are the lowest while the 2025 A7C alternatives are the highest. The emission factors are gradually decreasing, and the traffic levels are gradually increasing over this time period. Since the highest concentration occurs in the Year 2025 this is clearly the worst case year. The 2008 CO levels with and without the project are the same, however, the CO levels for 2018 A7 are slightly less than 2018 No Action. This is a result of the lower traffic and congestion level for the 2018 A7 and as a result better CO concentration levels. The CO concentration levels for 2018 A7 are similar to the buildout 2025 A7C. Overall, the 2018 No Action results in the highest CO levels and represents the worst-case alternative.

The CO concentration levels for the 2025 A7 toll-free with and without the project were assessed and the results are presented in Table 4-41.

TABLE 4-41
CO (PPM) PROJECTIONS FOR THE A7C ALTERNATIVE VERSUS A7 TOLL-FREE

Site	INTERSECTION	TOLL-FREE ALTERNATIVE 2025 NO ACTION 1-hr/8-hr	TOLL-FREE ALTERNATIVE 2025 Scenario 43 A7 1-hr/8-hr	2025 Scenario 29 A7C 1-hr/8-hr
5	Crown Valley/Marguerite	12.0 / 8.4	7.8 / 5.5	**8.0 / 5.6**

The CO concentration levels for 2025 A7 Toll-free are the lowest while the 2025 No Action are the highest. The 2025 A7 Toll-free shows an overall improvement when compared to 2025 No Action. This is indicative of the better local traffic conditions associated with the 2025 A7 Toll-free alternative. The 2025 A7 Toll-free alternative shows a slight improvement over the 2025 A7C. However, the 2025 No Action CO concentration levels are the highest and represents the worst case alternative.

4.2.4.1 Speed Sensitivity Along Corridor

The effects of varying speeds on the transportation corridor were investigated for the A7C. CO modeling was assessed for three speeds at two critical receptors along the proposed transportation corridor. For this alternative, speeds of 55, 60 and 65 miles per hour (mph) were assessed. Higher speeds could not be assessed because emission rates are available only for speeds of 65 mph or less. The 1-hour and 8-hour CO concentration results are shown in Table 4-42. The speeds are presented in mph and km/h.

TABLE 4-42
CO (PPM) PROJECTIONS FOR THE SPEED SENSITIVITY RUNS

Site	INTERSECTION	2025 **A7C** **55 mph** **(93 km/h)** 1-hr/8-hr	2025 **A7C** **60 mph** **(102 km/h)** 1-hr/8-hr	2025 **A7C** **65 mph** **(110 km/h)** 1-hr/8-hr
4	SR 241/Oso Parkway	3.4 / 2.4	3.6 / 2.5	3.8 / 2.7
14	SR 241/Avenida Pico	3.8 / 2.7	3.9 / 2.7	4.2 / 2.9

The results indicate that the CO concentration levels at 60 mph are slightly higher than at 55 mph, and CO concentrations at 65 mph are the highest of the three speeds at both receptors. This is primarily due to the steady rise in the emission rates at 60 and 65 mph. In fact, the emission rate curve shows a dramatic increase between the speeds 60 and 65 mph. The 65 mph is most representative of the typical speed on SR 241.

4.2.4.2 Ultimate Configuration

CO modeling was assessed for the ultimate configuration (Table 4-43). The ultimate configuration proposes an 8-lane transportation corridor from Oso Parkway to I-5. It should be noted that the ultimate configuration is equivalent to a toll-free alternative but is not expected to occur before 2025. However, traffic information was only available up to year 2025. For this report, 2025 traffic volumes will be utilized for the ultimate configuration.

TABLE 4-43
CO (PPM) PROJECTIONS FOR THE A7C ULTIMATE CONFIGURATION

Site	**INTERSECTION**	**2025** **Scenario 5** **NO ACTION** 1-hr/8-hr	**2025** **INITIAL** **CONFIG.** **Scenario 8** **A7C** 1-hr/8-hr	**2025** **ULTIMATE** **CONFIG.** **TOLL-FREE** **Scenario 43** **A7C** 1-hr/8-hr
4	SR 241/Oso Parkway	3.7 / 2.6	3.6 / 2.5	3.7 / 2.6

The results indicate that the CO concentration levels are similar for the three future alternatives. The 2025 A7C has slightly lower CO concentrations. The 2025 No Action actually has the lowest traffic volumes while the 2025 A7C toll-free (ultimate configuration) has the highest. However, the increase in traffic with the implementation of the corridor is not enough to cause a substantial local air quality impact.

4.2.5 ARTERIAL IMPROVEMENT ALTERNATIVES

The analysis presented in this subsection focuses on the Arterial Improvement Only (AIO) alternative. However, the results should also be considered representative for the Arterial Improvements plus I-5 Widening (AIP) alternative because the forecasts of the traffic effects are similar.

The results of the CO modeling for the AIO alternatives are summarized in Table 4-44 for 1-hour and 8-hour concentrations for CO. The pollutant levels are expressed in ppm for CO. The CO levels are composites of the background levels of CO coming into the area plus those generated by the local roadways. The receptor locations are presented in Figure 4-4.

TABLE 4-44
ARTERIAL IMPROVEMENT ONLY, CO AND PM10 PROJECTIONS - 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

	INTERSECTION	CARBON MONOXIDE EXISTING 1-hr/8-hr	 NO ACTION 1-hr/8-hr	 Scenario 33 AIO 1-hr/8-hr
1	I-5/Alicia Parkway	8.5 / 6.5	5.6 / 4.1	5.5 / 4.1
2	Felipe/Oso Parkway	8.0 / 5.7	8.0 / 5.6	8.2 / 5.7
3	Antonio Pkwy./Oso Pkwy.	6.2 / 4.4	6.9 / 4.8	7.5 / 5.2
4	SR-241/Oso Parkway	4.9 / 3.6	3.7 / 2.6	3.8 / 2.7
5	Crown Valley/Marguerite	8.6 / 6.1	12.0 / 8.4	8.0 / 5.6
6	I-5/Ortega Highway	7.6 / 5.7	6.0 / 4.5	5.2 / 3.8
7	Antonio Pkwy./Ortega Hwy.	5.5 / 3.9	6.9 / 4.8	11.5 / 8.0
8	I-5/Vista Hermosa	5.7 / 4.2	4.9 / 3.6	5.0 / 3.7
9	Ave. Pico/La Pata	4.7 / 3.4	6.3 / 4.4	6.5 / 4.5
10	I-5/El Camino Real	6.5 / 4.9	5.4 / 4.0	5.3 / 3.9
11	I-5/Ave. Pico	9.1 / 6.9	6.2 / 4.6	5.5 / 4.1
12	Antonio Pkwy./Crown Valley	5.1 / 3.7	6.9 / 5.2	7.5 / 5.2
13	Vista Hermosa/La Pata	-	5.3 / 3.7	-
14	SR-241/Ave. Pico	-	-	-
	State Standards:	20 ppm/ 9 ppm	20 ppm/ 9 ppm	20 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0
	Federal Standards:	35 ppm/ 9 ppm	35 ppm/ 9 ppm	35 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0

The CO modeling results for the existing, 2025 No Action and 2025 AIO alternatives are presented in Table 4-44. For the CO concentration levels, the pollutant levels are projected to comply with the state and federal CO AAQS for both 1-hour and 8-hour time frames at all receptor locations for all three cases.

The results show that of the three cases, the 2025 AIO CO concentration levels are the highest overall. The 2025 AIO CO levels are the highest at Intersections 2, 3, 4, 6, 8, 9, and 13. This is primarily caused by the increase in peak traffic volumes and congestion levels associated with the implementation of the 2025 AIO for most of these intersections. In contrast, the 2025 AIO CO levels are the lowest at Intersections 1, 5, 6, 10 and 11. This is indicative of the better traffic condition in terms of peak traffic and congestion level in these areas when compared to the existing and 2025 No Action alternatives. Of the two future alternatives, the 2025 AIO CO concentration levels are overall higher than the 2025 No Action CO concentration levels for about half of these intersections. This is a result of higher traffic volumes and worse congestion levels associated with the 2025 AIO alternative. Therefore, higher CO levels will result at these intersections. The CO levels associated with the 2025 AIO alternative are the highest and represent the worst-case alternative for half of the intersections.

The existing CO concentration levels are also the highest for a number of intersections. These are Intersections 1, 6, 8, 10 and 11. The existing alternative actually have the lowest traffic but is more than offset by the higher existing background CO concentration levels and emission rates. The future background CO and emission rates are projected to decrease steadily.

For comparison purposes, two special alternatives, opening year 2008 and ten-year increment 2018, with and without the project were analyzed for the worst case intersection. The worst case intersection has the highest level of CO concentration for the 2025 AIO alternative. For this alternative, the worst case intersection is Antonio Parkway/Ortega Highway (Site 7). The CO modeling results of these two special alternatives are shown in Table 4-45

TABLE 4-45
CO PROJECTIONS – 2025 AIO vs. INTERIM YEAR ALTERNATIVES

		INTERIM YEARS				
		Year 2008		**Year 2018**		**Year 2025**
		NO ACTION	**Scenario 33 AIO**	**NO ACTION**	**Scenario 33 AIO**	**Scenario 33 AIO**
Site	**INTERSECTION**	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr	1-hr/8-hr
7	Antonio Pkwy./Ortega Hwy.	4.5 / 3.2	4.7 / 3.3	5.9 / 4.1	6.6 / 4.6	11.5 / 8.0

The CO concentration levels for the 2008 alternatives are the lowest while the 2025 AIO alternatives are the highest. The emission factors are gradually decreasing, and the traffic levels are gradually increasing over this time period. Since the highest concentration occurs in the Year 2025 this is clearly the worst case year. For both 2008 and 2018 alternatives, the future CO levels with project are slightly higher than no project. This indicates that the project will cause a small increase in the future traffic condition, and as a result slightly higher CO concentration levels for both 2008 AIO and the 2018 AIO alternatives. The 2025 AIO results in the highest CO levels and represents the worst case alternative.

4.2.5.1 Speed Sensitivity Along Arterials

The effects of varying speeds on the local arterials were investigated for the AIO. CO modeling was assessed for three speeds at two critical receptors along Antonio Parkway. For this alternative, speeds of 5, 10 and 15 mph were assessed. These lower speeds correspond to the two heavily congested Antonio Parkway intersections. The 1-hour and 8-hour CO concentration results are shown in Table 4-46. The speeds are presented in mph and km/h.

TABLE 4-46
CO (PPM) PROJECTIONS FOR THE SPEED SENSITIVITY RUNS

Site	INTERSECTION	2025 **AIO 5 mph (8 km/h)** 1-hr/8-hr	2025 **AIO 10 mph (17 km/h)** 1-hr/8-hr	2025 **AIO 15 mph (25 km/h)** 1-hr/8-hr
3	Antonio Pkwy./Oso Pkwy.	8.1 / 5.7	6.1 / 4.3	5.1 / 3.6
7	Antonio Pkwy./Ortega Hwy.	11.5 / 8.0	7.8 / 5.5	6.3 / 4.4

The results indicate that the CO concentration levels at 10 mph are slightly higher than at 15 mph, and CO concentrations at 5 mph are the highest of the three speeds at both receptors. This is primarily due to the dramatic rise in the emission rate at 10 mph or lower. In fact, the emission rate curve shows a substantial increase for the speed of 10 mph or less. The operating speeds of 5 and 10 mph are most representative of the typical speeds at these two Antonio Parkway intersections.

4.2.6 I-5 WIDENING ALTERNATIVES

The analysis presented in this subsection focuses on the I-5 Widening (I-5) alternative in the initial configuration. The results of the CO modeling for the I-5 alternative are summarized in Table 4-47 for 1-hour and 8-hour concentrations for CO. The pollutant levels are expressed in ppm for CO. The CO levels are composites of the background levels of CO coming into the area plus those generated by the local roadways. The receptor locations also are presented in Figure 4-4.

TABLE 4-47
I-5 WIDENING (I-5), CO AND PM10 PROJECTIONS - YEAR 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

	INTERSECTION	CARBON MONOXIDE EXISTING 1-hr/8-hr	 NO ACTION 1-hr/8-hr	 Scenario 38 I-5 1-hr/8-hr
1	I-5/Alicia Parkway	8.5 / 6.5	5.6 / 4.1	5.6 / 4.1
2	Felipe/Oso Parkway	8.0 / 5.7	8.0 / 5.6	8.0 / 5.6
3	Antonio Pkwy./Oso Pkwy.	6.2 / 4.4	6.9 / 4.8	6.9 / 4.8
4	SR-241/Oso Parkway	4.9 / 3.6	3.7 / 2.6	4.2 / 3.0
5	Crown Valley/Marguerite	8.6 / 6.1	12.0 / 8.4	8 / 5.6
6	I-5/Ortega Highway	7.6 / 5.7	6.0 / 4.5	5.3 / 3.9
7	Antonio Pkwy./Ortega Hwy.	5.5 / 3.9	6.9 / 4.8	9.9 / 6.9
8	I-5/Vista Hermosa	5.7 / 4.2	4.9 / 3.6	5.0 / 3.7
9	Ave. Pico/La Pata	4.7 / 3.4	6.3 / 4.4	6.3 / 4.4
10	I-5/El Camino Real	6.5 / 4.9	5.4 / 4.0	5.2 / 3.8
11	I-5/Ave. Pico	9.1 / 6.9	6.2 / 4.6	5.5 / 4.1
12	Antonio Pkwy./Crown Valley	5.1 / 3.7	6.9 / 5.2	6.9 / 4.8
13	Vista Hermosa/La Pata	-	5.3 / 3.7	-
14	SR-241/Ave. Pico	-	-	-
	State Standards:	20 ppm/ 9 ppm	20 ppm/ 9 ppm	20 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0
	Federal Standards:	35 ppm/ 9 ppm	35 ppm/ 9 ppm	35 ppm/ 9 ppm
	No. of Exceedance	0 / 0	0 / 0	0 / 0

The CO modeling results for the existing, 2025 No Action and 2025 I-5 cases are presented in Table 4-47. For the CO concentration levels, the pollutant levels are projected to comply with the state and federal CO AAQS for both 1-hour and 8-hour at all receptor locations, for all three alternatives.

The results show that the existing CO concentration levels are generally the highest at a number of intersections while the 2025 I-5 CO levels are the lowest. The existing CO levels are the highest at Intersections 1, 2, 4, 6, 8, 10 and 11 most of these being next to the I-5. This is mainly due to the higher existing background CO concentration levels and the higher existing emission rates. The amount of existing traffic is actually lower than the two future alternatives but is offset by the higher existing background CO and emission rates. In contrast, the existing CO levels are the lowest at Intersections 3, 7, 9 and 12. This is indicative of the lower existing local traffic condition in these areas when compared to the future alternatives.

Of the two future alternatives, the 2025 I-5 CO concentration levels are slightly lower than the 2025 No Action CO concentration levels, specifically at Intersections 5, 6, 10 and 11. The amount of traffic associated with the 2025 I-5 is higher than the 2025 No Action at some of these intersections; however, the congestion level is projected to improve with the implementation of the 2025 I-5. Consequently, the 2025 I-5 results in slightly better air quality because of reduced congestion levels. The 2025 No Action alternative generates slightly higher CO concentration levels overall and represents the worst case alternative.

4.2.6.1 Weekday Versus Weekend Analysis

The traffic analysis used for determining local air impacts represents typical weekday traffic. In general, traffic volumes, especially peak hour volumes, are higher during the weekday than during the weekend. I-5 represents a special situation, where weekend traffic volumes are higher than weekday traffic volumes. Therefore, a special analysis was conducted for locations along the I-5 for weekend traffic conditions.

For comparison purposes, two weekend alternatives with and without the project were analyzed for five I-5 intersections. The CO modeling results of the two weekend alternatives are shown in Table 4-48.

TABLE 4-48
CO (PPM) PROJECTIONS FOR THE I-5 WEEKDAY VERSUS I-5 WEEKEND

Site	INTERSECTION	WEEKEND 2025 NO ACTION 1-hr/8-hr	WEEKEND 2025 Scenario 38 I-5 1-hr/8-hr	WEEKDAY 2025 Scenario 38 I-5 1-hr/8-hr
1	I-5/Alicia Pkwy.	5.8 / 4.3	5.8 / 4.3	**5.6 / 4.1**
6	I-5//Ortega Hwy.	5.9 / 4.4	5.2 / 3.8	**5.3 / 3.9**
8	I-5/Vista Hermosa	5.0 / 3.7	4.8 / 3.5	**5.0 / 3.7**
10	I-5/El Camino Real	5.6 / 4.1	5.5 / 4.1	**5.2 / 3.8**
11	I-5/Ave. Pico	6.2 / 4.6	5.4 / 4.0	**5.6 / 4.1**

Of the two weekend alternatives, the CO concentration levels for the 2025 I-5 are lower than the No Action alternative. The 2025 I-5 shows an overall improvement when compared to the 2025 No Action. This is indicative of the better future traffic condition associated with the 2025 I-5. The 2025 I-5 traffic volumes are actually higher than the 2025 No Action, but the congestion levels at these five intersections will be alleviated with the implementation of the I-5 alternative resulting in decreased emissions.

Comparing the 2025 I-5 weekend results with the 2025 I-5 weekday we see that the future CO concentration levels for the weekend alternative are slightly less than the weekday at Intersections 6, 8 and 11. The amount of weekend peak traffic at these intersections is actually higher than the weekday, except at Receptor 6, but the congestion level is the same or slightly better for the weekend alternative. In contrast, the CO levels for the weekend alternative are slightly higher at Intersections 1 and 10. This is due to the slight increase in peak traffic associated with the weekend alternative. However, the increase in peak traffic volume does not greatly affect the congestion level at these intersections. In summary, the concentrations forecasted for the weekend and weekday vary slightly, but overall are about the same.

4.2.6.2 Speed Sensitivity Along Arterials

The effects of varying speeds on the I-5 were investigated for the I-5 alternative. CO modeling was assessed for four speeds at two critical receptors along the I-5. For this alternative, speeds of 30, 35, 40 and 50 miles per hour (mph) were assessed. The 1-hour and 8-hour CO concentration results are shown in Table 4-49. The speeds are presented in mph and km/h.

TABLE 4-49
CO (PPM) PROJECTIONS – SPEED SENSITIVITY RUNS

Site	**INTERSECTION**	2025 **I-5** **30 mph** 1-hr/8-hr	2025 **I-5** **35 mph** 1-hr/8-hr	2025 **I-5** **40 mph** 1-hr/8-hr	2025 **I-5** **50 mph** 1-hr/8-hr
1	I-5/Alicia Parkway	5.7 / 4.2	5.4 / 4.0	5.3./ 3.9	5.2 / 3.8
11	I-5/Avenido Pico	4.6 / 3.3	4.5 / 3.3	4.4 / 3.2	4.4 / 3.2

The results indicate that the CO concentration levels at 30 mph are the highest while CO concentrations at 50 mph are the lowest. This is primarily due to the slight decline in the emission rates as the speeds steadily rise. This is true for speeds between 15 and 55 mph. The operating speeds between 30 and 40 mph are most representative of the typical speeds along I-5 during the peak-hour traffic at these two intersections. However, the emission rates rise dramatically for faster speeds of 60 mph or higher. This would occur during ideal uninterrupted flow conditions; however, the CO concentration would also be higher due to the higher speeds. The higher CO concentrations would occur during the off peak-hour in comparison to the peak-hour for the I-5 alternative.

4.2.7 QUALITATIVE PM10 HOT SPOT ANALYSIS

This section presents a qualitative analysis of the potential for PM10 hot spots. That is areas local to roadways, most notably intersections and interchanges, where due to congestion or other factors the concentrations of PM10 might be of concern. The information in this section focuses on the federal requirements and standards for PM10. (Additional analysis of PM10, which focuses on state standards and requirements, is provided in Section 5.2 - Quantitative PM10 Hot Spot Analysis.) Much of the information and analysis methodology used in this section comes from the "Guidance for Qualitative Project Level "Hot Spot" Analysis in PM-10 Nonattainment and Maintenance Areas," by the Federal Highway Administration, September 2001.

Section 93.116 of the transportation conformity rule states that any project level conformity determination in a PM10 nonattainment area must document that no new local PM10 violations will be created and the severity or number of existing violations will not be increased as a result of the project. Since EPA has not released modeling guidance on how to perform quantitative PM10 hot spot analysis, such quantitative analysis is not currently required by federal regulations (40 CFR 93.123(b)(4)). A reasoned and logical explanation of why a hot spot will not be created or worsened is to be provided for project-level conformity determinations.

The FHWA guidance document provides a list of information potentially relevant to the qualitative analysis. The suggested information is discussed below.

Project Description. The descriptions of the project alternatives have previously been provided in Section 2.0 – Description of the Alternatives. The descriptions identify the project setting and location and the scope and physical attributes of the proposed alternatives.

Existing Air Quality. The existing air quality has been provided in detail in Section 3.5 – Monitored Air Quality. The nearest monitoring stations are located at El Toro/Mission Viejo at the north end of the project site, and the Oceanside monitoring station south of the project. The federal standards for PM10 have not been exceeded at these sites for more than 5 years. Additionally, limited monitoring of PM10 was conducted in the project area, which lies between the monitoring stations, that also showed no exceedances of the federal standards for PM10.

Traffic Associated With The Project. A detailed traffic analysis was conducted for the project alternatives by Austin Foust and Associates (SOCTIIP Traffic and Circulation

Report). The traffic analysis showed that the project alternatives generally increased the regional VMT slightly in comparison to a comparable No Action alternative. More notable is the fact that a substantial amount of VMT was removed from the arterial roadway network, which is stop and go traffic, to the tollway where cars travel in a free flow condition. (More discussion of the traffic forecasts with specifics for the project alternatives is provided later in this section.)

Climate Information. The climate and meteorology of the area is presented in Section 3.2 – Climate. The area has mild temperatures. Generally the wind is light to moderate during the day and calm to light during the night.

Location of Monitoring Stations. The nearest monitoring station was located in El Toro and was moved in recent years to Mission Viejo. This station would be located in the north end of the study area. The Oceanside monitoring station is located south of the project area. The monitoring stations locations are discussed in more detail in Section 3.5.2 – District Monitoring Stations. It should also be noted that no major sources of PM10, such as power plants, are located near the monitoring sites.

Miscellaneous Information. All roadways proposed as part of the project build alternatives would consist of paved roadways. There will be some temporary unpaved roads during the construction period. The climate in the area is mild, and therefore, the roadways will never be sanded or salted for winter storm events. The build alternatives would be swept on a regular basis as part of the water runoff quality control program. Additionally, mitigation measures (refer to Section 6.2 – Mitigation Measures for Long Term Impacts) require additional road cleaning any time visible track-out occurs and when a storm event has caused soil to be deposited on the roadway. Paving or chemical stabilization of a portion of unpaved roads (if present) that connects with the facility would also be required.

Mitigation Practices. Mitigation practices that will be employed have been described in the previous paragraph.

The FHWA guidance provides six example approaches for qualitatively evaluating PM10 hot spots. The second example, Example B, in the guidance document is the most relevant to the proposed project. It is designed for projects that may increase vehicle miles traveled (VMT), but whose primary effect is to reduce vehicle idling time. Increases in VMT can lead to increases in hot spot violations. Increasing the VMT does increase the tailpipe emissions; tire wear emissions, and the paved road dust (also referred to as re-entrained particulate matter). However, these emissions of PM10 are generally spread out along the entire roadway network and not concentrated in any one area. Hot spots or high levels of local pollutant concentrations generally occur at congested intersections. Here a large number of vehicles may sit and idle or move slowly, as a result, being a large amount of emissions are released within a small area. Therefore, to reduce the severity of hot spot conditions it is important to reduce the level of congestion, particularly on the arterial roadway network.

The traffic study was consulted to determine the potential impact of the project alternatives on PM10 hot spots. Both the change in regional VMT and change in arterial roadway traffic were considered. A preliminary analysis indicated that the buildout roadway network (as opposed to the committed network) was worst case for the year 2025. The five primary alternatives were considered. The results of the analysis are presented in Table 4-50. The first column simply identifies the project alternative. The second column represents the change in regional traffic in comparison to the No Action alternative. The final column presents the change in arterial roadway travel.

Table 4-50
CHANGE IN TRAVEL FOR REGION AND ARTERIAL ROADWAYS

Alternative	Change in Regional VMT	Change in Arterial VMT
FEC	14,981	-386,398
CC	17,671	-368,947
A7C	23,413	-400,003
AIO	-15,365	58,101
I-5	5,129	-201,930

The FEC alternative will result in a very small increase in regional VMT (i.e., 14,981 vehicle miles per day in comparison to the 421,712,541 miles project for the region). The arterial roadway traffic will decrease substantially more (i.e., 386,398 miles per day). The effect of reducing traffic on the arterial roadway network will be more than 25 times as great as the overall regional traffic increase. More importantly, traffic will be removed from the arterial roadway intersections where congestion leads to PM10 hot spots. Therefore, the qualitative analysis for PM10 indicates that the FEC alternative would provide a reduction in the number and severity of PM10 hot spots.

Similar results occur with the CC, A7C, and I-5 alternatives. Small increases in regional VMT would occur with the project, however, a much larger amount of traffic would be reduced from the arterial roadways, a more critical location relative to PM10 hotspots. Therefore, the qualitative analysis for PM10 indicates that the CC, A7C and I-5 alternatives would also result in a reduction in the number and severity of PM10 hot spots.

The remaining primary alternative, the AIO, shows a decrease in regional VMT and a larger increase in arterial roadway traffic. However, this alternative improves existing arterial roadways rather than constructing tollway or freeway lanes. The arterial roadway improvements will be done in a manner to relieve congestion and therefore, this alternative would also not be expected to increase the number or severity of PM10 hot spots.

In addition to the arguments above it should be noted that road silt loads are lower on limited access freeways than on local streets. The California Air Resources Board (ARB) has developed silt loading factors to represent the amount of silt on various road types in California (ARB, 1997). ARB data indicate that freeways have lower silt loads than local streets. Reentrained road dust PM_{10} emissions from on-road traffic are a function of silt loads on the road. Relocating traffic from existing surface streets to a limited access tollway or freeway will result in reduced PM_{10} emissions since silt loads are lower on freeways and tollways.

4.2.8 SUMMARY OF LOCAL AIR QUALITY IMPACTS

None of the local air quality impacts of the corridor, arterial and I-5 alternative results in an exceedance for CO. For all build alternatives, the future CO emissions are projected to be in compliance with the 1-hour and 8-hour state and federal AAQS, and therefore, none of the build alternatives will result in an adverse impact on CO levels. None of the build alternatives will result in local air quality impacts.

The qualitative analysis of PM10 hot spots indicate that the number and severity of PM10 hot spots would not be increased, and in fact would like be decreased with the project alternatives in comparison to the No Action alternatives.

4.3 CUMULATIVE IMPACTS

The potential air quality impacts of the SOCTIIP build alternatives have been evaluated with respect to various roadway networks and development levels and build out of the County in accordance with OCP-2000. The focus of the regional/subregional analysis has been on the committed roadway network with RMV developed at 14,000 dwelling units. Analyses of these scenarios with RMV at 21,000 dwellings and the buildout of the MPAH/RTP are presented in this report (refer to Section 5.2), however, the results are presented again to highlight the cumulative nature of the buildout of the roadway network (MPAH/RTP), build out as indicated by OCP-2000 and the highest potential for development of RMV.

Figure 4-5 shows the increases with respect to the corresponding No Action Alternative for the primary alternatives. The change in emissions for HC and NOx are presented in the top chart, and CO emissions are presented in the lower chart. PM10 emissions are not presented because the changes in these emissions will not be substantial as shown in Section 5.2. Corridor alternatives (Initial Alternatives) are presented for the Far East Corridor Complete (FEC), Far East with the Talega Variation (FEC-TV), Central Corridor Complete (CC), and Alignment 7 Corridor with the Far East Crossover Variation (A7C-FECV). The Arterial Improvement Only (AIO), the Arterial Improvement Plus I-5 Improvements (AIP), and the I-5 Widening Alternative (I-5 Alternative) are also presented. Additionally, the FEC, CC, and A7C Alternatives are presented for toll free conditions, which would also include the ultimate configurations.

HC emissions decrease for all alternatives. Alternatives with a substantial decrease (55 pounds per day or 25 kilograms per day) include FEC (including FEC-W and FEC-M), FEC-TV, CC and the A7C-FECV (including A7C-FEC-M). Additionally, all toll-free scenarios that were assessed showed a substantial decrease in HC emissions.

All alternatives have increases in NOx emissions above 25 kilograms per day (55 pounds per day), and these increases should be considered an adverse cumulative impact. The AIO Alternative has the lowest increase in NOx emissions. The I-5 Widening Alternative will generate the most emissions of the non-toll free conditions. The toll free conditions result in the highest increases in NOx emissions, and these increases would be considered an adverse impact.

All the alternatives show decreases in CO, and all decreases, except one, are greater than 250 kilograms per day (550 pounds per day). The AIO Alternative is the only alternative that is below this level, and shows a slight decrease. The toll free conditions result in the highest CO emission decreases.

In general, the cumulative impacts described above parallel the project alternative impacts described in Section 5.1.8. The same alternatives will generate cumulative adverse impacts as identified in Section 5.1.8.

4.4 COMPLIANCE WITH AIR QUALITY PLANNING

The following sections address the primary air quality planning requirements applicable to the SOCTIIP Alternatives. Specifically, consistency of the project with the AQMP and conformity with the Clean Air Act (CAA) are addressed. These two items are not the same. As discussed below, consistency with the AQMP is a requirement of the California Environmental Quality Act (CEQA). Conformity is a federal Clean Air Act requirement. Both the state and federal requirements focus on whether the project is consistent with the AQMP, which is the local portion of the SIP. However, the procedure for determining conformity (federal requirement) and consistency (state requirement) differ.

4.4.1 CONSISTENCY WITH THE AQMP

An Environmental Impact Report (EIR) must discuss any inconsistencies between the proposed project and applicable general plans and regional plans (CEQA guidelines, Section 15125 (d)). Regional plans that apply to the proposed project include the Air Quality Management Plan (AQMP). In this regard, this section will discuss any inconsistencies between the project alternatives and the AQMP.

The purpose of the consistency discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the SOCTIIP project would interfere with the region's ability to comply with federal and state air quality standards. Thus, the role of this discussion is to set forth the issue and to relate it to the discussion of environmental impacts. If the decision-maker determines that the project is inconsistent, the lead agency (i.e., the TCA) may consider project modifications or inclusion of mitigation to eliminate the inconsistency.

The SCAQMD's CEQA Handbook states "New or amended General Plan Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." A proposed project should be considered to be consistent with the plan if it furthers one or more policies and does not obstruct other policies. The Handbook identifies two key indicators of consistency:

> (1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.
> (2) Whether the project will exceed the assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase.

These criteria are evaluated in the following sections.

Criterion 1 - Increase in the Frequency or Severity of Violations?
Based on the air quality modeling analysis in this technical report, it is expected that there will be short-term construction impacts for all the proposed project alternatives. It is unlikely that short-term construction activities will increase the frequency or severity of existing air quality violations due to required compliance with SCAQMD Rules and Regulations, but emissions will be generated in excess of SCAQMD's threshold criteria.

Regional/subregional emissions are anticipated to increase for all project alternatives in comparison to the No Action Alternative. However, in general, the emissions over time will decrease substantially for the region and subregion with or without the project. That is, in comparison to existing HC and NOx (the precursors to ozone formation) emissions for the region and subregion, the future conditions with or without the project will be substantially less than they are today. Therefore, the frequency and severity of ozone concentrations violations will decrease in future years with or without the SOCTIIP Alternatives. PM10 emissions are anticipated to increase in future years with or without the project. Therefore, there may be a slight increase in the severity of PM10 concentrations by 2025 with or without the SOCTIIP build alternatives.

Many of the alternatives result in substantially higher emissions than the emissions forecasted in the AQMP. The emissions forecasted in the AQMP are based on the FEC Alternatives. Alternatives which exceed the emissions assumed in the transportation modeling underpinning the AQMP include the FEC-OHV, FEC-APV, CC-ALPV, CC-OHV, A7C-ALPV, A7C-OHV, AIO, AIP, and I-5 Widening. These alternatives could delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

Local air quality analyses were conducted for areas along the build alternatives and near intersections that would be effected by the build alternatives. Both carbon monoxide (CO) and respirable particulate (PM10) were investigated. These two pollutants are the key indicators of pollution along roadways. No exceedances of CO were forecasted, and none of the SOCTIIP build alternatives would increase the frequency or severity of violations of the AAQS. The background levels of PM10 are anticipated to exceed the ambient air quality standards in future years. None of the project alternatives will add significantly to PM10 concentrations. Therefore, there will not be an increase in the frequency or severity of violations for PM10 concentrations.

Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the SOCTIIP build alternatives with the assumptions in the AQMP and its parent documents. Thus, the emphasis of this criterion is to insure that the analyses conducted for the SOCTIIP build alternatives are based on the same forecasts as the AQMP. The Regional Comprehensive Plan and Guide (RCP&G), prepared by SCAG contain many of the forecasts upon which the AQMP is based. The RCP&G consists of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality, Water Quality, and Hazardous Waste Management chapters constitute the Core Chapters of the document. These chapters currently respond directly to federal and state requirements placed on SCAG, including conformity requirements. Local governments are required to use the RCP&G as the basis of evaluating projects for consistency with applicable regional plans under CEQA.

The traffic modeling on which much of the air quality assessment is based uses the OCTAM model which has as input Orange County Preferred 2000 (OCP-2000) growth projections which are consistent with adopted SCAG 2001 RTP growth forecasts. The Orange County growth forecasts are consistent with SCAG 2001 forecasts. Therefore, the analysis is consistent with the growth projections assumed in the RCP&G and the AQMP.

Two roadway networks were assessed as part of the air quality analysis. The networks included a committed network that contained the existing roadway facilities plus roadway improvements for which there are currently firm funding and/or commitments, and a full build-out of the Master Plan of Arterial Highways (MPAH)/Regional Transportation Plan (RTP) network. The MPAH/RTP network is consistent with the assumptions contained in the AQMP.

The 2002 Regional Transportation Improvement Plan (RTIP), which was approved by the federal agencies on October 4, 2002, describes the proposed project as follows (abbreviations have been spelled out for clarity):

> (Foothill Transportation Corridor – South) (I-5 to Oso Parkway) (15 miles) two mixed flow lanes each direction by 2010; and two additional mixed flow each direction plus climbing and auxiliary lanes as required by 2015 per Southern California Association of Governments/ Transportation Corridor Agency Memorandum of Understanding April 5, 2001.

The above description would clearly be consistent with the FEC, FEC-W, FEC-M, FEC-CV, A7C-FECV, A7C-FEC-M, and the A7C-FECV-C Alternatives. The following alternatives would also be consistent with the RTIP description; Far East Corridor – Agricultural Fields Variation (FEC-AFV) and the Alignment 7 Corridor – Far East Crossover (Agricultural Fields) (A7C-FECV-AF). The above alternatives are all roughly 15 miles (25 km.) long and connect into the I-5 Freeway at the south end and connect with the existing Foothill Transportation Corridor (FTC) at Oso Parkway at the north end.

The corridor alternatives which connect with the I-5 Freeway near Avenida Pico or Ortega Highway are not consistent with the mileage identified in the RTIP. Therefore, it is questionable whether these alternatives are consistent with the description in the RTP. These alternatives, however, are intended to serve the same function and the MPO may find that these alternatives are similar enough in function (i.e., congestion relief and emissions reduction from reduced idling) to determine that they are consistent with the RTIP. These alternatives are the FEC-TV, FEC-OHV, FEC-APV, CC, CC-ALPV, CC-OHV, A7C, Alignment 7 Corridor – 7 Swing Variation (A7C-7SV), Alignment 7 Corridor – Avenida La Pata (A7C-ALPV), and the Alignment 7 Corridor – Ortega Highway Variation (A7C-OHV).

The I-5, AIP, and AIO Alternatives do not match up with the project description in the RTIP. They do not connect with the FTC at Oso Parkway, do not include the appropriate type or number of lanes, and generally do not have the identified length.

Inclusion of AQMP Measures

The 1997 AQMP lists strategies designed to improve air quality throughout the region. These measures examine solutions to regional air quality concerns. Short- and intermediate-term measures are included in the AQMP that propose the application of available technologies and management practices between 1997 and 2005. These measures rely on known technologies and proposed actions to be taken by several agencies that currently have the statutory authority to implement such measures. Many control measures included in the AQMP are intended to reduce emissions from specific sources or activities. The control measures are generally divided into the following categories; stationary source control measures, mobile source control measures to be implemented by the SCAQMD, and mobile source control strategies to be implemented by the California Air Resources Board.

The toll road corridor alternatives are included as a Transportation Control Measure in TCM-01, Transportation Improvements within the SCAB. FTC-S is included in TCM-01 as a "priced HOV alternative." Priced alternatives to HOV lanes include toll roads, high occupancy travel HOT lanes, and other transportation pricing mechanisms that attempt to achieve the same goal of increased vehicle occupancy through cost-effective pricing incentives, rather than through costly construction of new HOV lanes. While the toll roads, including FTC-S, are included in TCM-01 because they are priced alternatives to HOV projects, non-priced mixed flow projects in the RTIP are not part of TCM-01. Instead, existing and future mixed flow projects programmed in the adopted RTIP are assumed in the baseline transportation system of the AQMP and are not included in any control measures for emission reduction credit. The baseline transportation system serves as the foundation for comparing emissions before and after AQMP control measures contained in TCM-01 are implemented.

The toll road corridor alternatives do not impede the timely implementation of other transportation control measures because of their inclusion in TCM-01, and because there are no other features of those alternatives that will interfere with implementation of the other TCMs. Building one of these alternatives is necessary to implement TCM-01 and to achieve the benefits of TCM-01. The non-toll road/non-corridor alternatives will not interfere with most of the TCMs, however, if one of those alternatives is selected, substitute measures would need to be implemented to provide the same level of benefit as the FTC-S within the SCAB AQMP/SIP. In the SDAPCD, the SOCTIIP is not a TCM and there are no features that will interfere with timely implementation of TCMs.

Two measures included in the AQMP have some relevance to the SOCTIIP build alternatives. The first measure is "BCM-01 Emission Reductions from Paved Roads." This measure includes paving or treating a portion of any dirt road that merges onto a paved road, more efficient street cleaning procedures, and clean up of streets within 72 hours of a storm event. Mitigation measures have been recommended in Section 6.0 (Mitigation Measures) that would incorporate these AQMP measures into the SOCTIIP build alternatives. The second relevant AQMP measure is simply labeled "TCM-01 Transportation Improvements." This measure includes a long list of projects that are contained in the RTP and subsequently in the RTIP. The consistencies of the project alternatives with the RTIP were discussed above.

In summary, with the recommended mitigation measures in Section 6.0 the project alternatives will include all relevant AQMP measures.

4.4.2 TRANSPORTATION CONFORMITY/STATE IMPLEMENTATION PLAN

4.4.2.1 Introduction

"Transportation conformity is a Clean Air Act requirement for transportation plans, programs, and projects to conform to state air quality plans. Conformity to a state air quality plan means that transportation activities will not produce new air quality violations, worsen existing violations, or delay timely attainment of the national air quality standards." (65 Fed.Reg. 18912)

"Required under section 176(c) of the Clean Air Act as amended in 1990, the transportation conformity rule established the criteria and procedures by which the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and metropolitan planning organizations (MPOs) determine the conformity of federally funded or approved highway and transit plans, programs, and projects to state air quality implementation plans (SIPs)." (62 Fed.Reg. 43780) The relevant portions of the transportation conformity rule are set forth in 40 C.F.R., subpart A, section 93.100 *et seq*. and are based on the final rules published by EPA in 62 Fed.Reg. 43780 (August 15, 1997) and 65 Fed.Reg. 18914 (April 10, 2000).

The State air quality plan referenced above is called a State Implementation Plan (SIP) (and sometimes a Federal Implementation Plan).

The metropolitan planning organization (MPO) and the United States Department of Transportation (DOT) through the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), have the responsibility to make the conformity determination. For the South Coast Air Basin (SCAB), the Southern California Association of Governments (SCAG) is designated as the MPO. The role of the United States Environmental Protection Agency (USEPA) is to review and comment on proposed conformity determinations. The "National Memorandum of Understanding between the U.S. Department of Transportation and the U.S. Environmental Protection Agency," effective date April 19, 2000 further defines the need and procedures for interagency cooperation on conformity determinations.

4.4.2.2 Conformity Criteria and Analysis

With certain exceptions described in the federal conformity regulations, FHWA projects must be found to conform before they are adopted, accepted, approved or funded. Transportation projects must conform to the following criteria established in the Clean Air Act section 176(c)(2)(C).

- They must come from a conforming transportation plan and TIP.
- The design concept and scope of the project that was in place at the time of the conformity finding must be maintained through implementation.

- The project design concept and scope must be sufficiently defined to determine emissions at the time of the conformity determination.

In regards to the criteria above, there are conforming Regional Transportation Plans for SCAG and SANDAG that include a SOCTIIP project. The conforming RTIP for SCAG (which is part of the TIP) contains a general project listing for the eventual selected SOCTIIP alternatives. The SCAG Fiscal Year 2002/03-2007-8 RTIP (called the 2002 RTIP for short) was approved by the federal agencies on October 4, 2002. SOCTIIP was included in the SANDAG RTIP in the past, including the 2000 RTIP, but was inadvertently dropped from the 2002 RTIP. TCA is working with SANDAG to add SOCTIIP back in to the RTIP, consistent with the SANDAG RTP. The SCAG and SANDAG RTP and SCAG RTIP conformity analyses are incorporated by reference into this EIS/SEIR. Documentation from applicable SANDAG and SCAG planning and programming documents and TIPs in which SOCTIIP is included are provided in the Appendix to this Air Quality Technical Report. The relevant pages from the documents listed below were provided. Note that SOCTIIP is represented in these documents as SR-241.

SCAG Document Excerpts

- 2001 Regional Transportation Plan (RTP), Appendix K, Project Lists cover sheet
- Page K-62 of Appendix K of the 2001 RTP, Orange County State Highways
- Final 2002 Regional Transportation Improvement Program Amendment #2 – State Highway Projects, page 22
- Final 2002 Regional Transportation Improvement Program (RTIP) (FY 2002/2003 – 2007/2008) – State Highway Project, page 21

SANDAG Document Excerpts

- SANDAG Board Actions of March 28, 2003 indicating approval of “Mobility 2030 – Regional Transportation Plan”
- Mobility 2030 – Regional Transportation Plan (RTP) (cover sheet)
- RTP: Table A.1 – Major Capital Improvements – Revenue Constrained Plan
- RTP: Table A.2 – Phased Highway Projects – Revenue Constrained Plan
- RTP: Table A.9 – Major Capital Improvements – Differences Between Scenarios
- RTP: Technical Appendix 3 – 2030 Transportation Network Data (first page)
- RTP: Table TA 3.9 – Highway Corridor Projects

The second criterion was discussed in Section 4.4.1, and primarily addresses the issue of whether the SOCTIIP is consistent with the design concept expressed in the RTP and RTIP. “Design concept” is defined in the conformity regulations as the “type of facility identified by the project, e.g.., freeway, expressway, arterial highway …etc.” (40 C.F.R. § 93.101). “Design scope” is defined in the conformity regulations as “the design aspects which will affect the proposed facility’s impact on regional emissions, usually as they relate to vehicle or person carrying capacity and control, e.g., number of lanes or tracks to be constructed or added, length of project, signalization, access control including approximate number and location of interchanges, preferential treatment for high-occupancy vehicles, etc." (40 C.F.R. § 93.101) The Far East Corridor alternatives are consistent with the design concept and scope assumed in the RTPs and TIPs. As a preferred alternative is identified, TCA will work with the metropolitan planning organizations to update regional emissions analyses and RTP/TIP conformity determinations as necessary. Design elements specific to each alternative such as the number and location of interchanges/intersections, auxiliary and truck climbing lanes and widening of arterial facilities connecting to SR 241 could affect the regional emissions analysis and require an updated conformity determination. TCA and FHWA will assure that all conformity requirements are met prior to FHWA issuing the Record of Decision. Relative to the third criterion, which is that the project design concept and scope are all sufficiently defined so that emissions associated with the project alternative can be determined at the time of the conformity determination, the Far East Corridor alternatives met this criterion when the last conformity determination was made. As the preferred alternative is identified, this would be re-evaluated for the preferred alternative to determine if a new conformity determination is needed.

Areas that have carbon monoxide (CO) or particulate matter (PM10) problems, such as the South Coast Air Basin (SCAB), must also show also that new localized violations of those pollutants will not result from project implementation. Section 4.2 presented the results of the local impact assessment for CO and PM10 and shows that new violations will not occur for any of the build alternatives.

40 C.F.R. 93.109, (part of the EPA Conformity Regulations) provides a summary of conformity requirements in Table 1 – Conformity Criteria. Criteria applicable to any transportation plan, program or project includes: a) determination of conformity based on most recent planning assumptions in force at time of determination (section 93.110); b) use of latest emission model available (section 93.111), and; c) public involvement and interagency consultation (section 93.112). The table lists four criteria specifically for projects from a conforming RTP and TIP. The first criteria is detailed in Section 93.114 and requires that there is a "currently conforming transportation plan and TIP." The SCAG 2001 Regional Transportation Plan has received an approval and positive conformity finding from the FHWA, as well as the SCAG 2002 RTIP, which was approved by the federal agencies on October 4, 2002. Both of these items are discussed earlier in this subsection. The second criteria is that the project is "from a conforming plan and TIP," and this is detailed in Section 93.115. This has been discussed previously in this section. The third criteria, from Section 93.116(a), is that the project must not cause or contribute to any new localized CO and PM10 violations or increase the frequency or severity of any existing violations. Section 93.116(b) further requires that for CO nonattainment areas the "project must eliminate or reduce the severity and number of localized CO violations in the area substantially affected by the project. Additional guidance on hot spots is provided in 40 C.F.R. section 93.109(d) and (e). Section 4.2 of this report examined the potential for CO and PM10 hot spots, based on a quantitative analysis using models and data required by EPA and outlined at 40 C.F.R. part 51, App. W Guidelines on Air Quality Models (as referenced in section 93.123). The analysis concluded that none of the alternatives would result in exceedances of the

Federal AAQS or cause substantial increases in concentrations. The fourth criteria concerns PM10 control measures and is detailed in Section 93.117. The regulations require that the project "must comply with PM10 control measures in the applicable implementation plan," and provide written commitments to include such controls at the time of the conformity finding. The applicable control measures have been identified in Section 4.4.1 and necessary mitigation measures identified in Section 6.0 – Mitigation Measures. In summary, as a preferred alternative is identified, TCA will work with the appropriate agencies to update regional emissions analyses and conformity determinations as necessary. All conformity requirements will be met prior to FHWA issuing the Record of Decision. The RTP and RTIP processes are renewed on a regular basis and the intent is to adapt to new circumstances. Again it should be noted that only emission estimates directly from the MPO will be used by the FHWA to base its conformity finding.

4.5 AIR TOXICS

In addition to the NAAQS set forth by EPA for the six criteria pollutants, EPA has also established a list of 33 urban air toxics. Urban air toxics, also known as hazardous air pollutants, are those pollutants that cause or may cause cancer or other serious health effects or adverse environmental and ecological effects. Most air toxics originate from human-made sources, including road mobile sources (e.g. cars, trucks, buses), non-road mobile sources (e.g. airplanes, lawnmowers, etc.) and stationary sources (e.g. factories, refineries, power-plants), as well as indoor sources (e.g. building materials). Some air toxics are also released from natural sources such as volcanic eruptions and forest fires.

These pollutants are in our atmosphere as a result of our industrialized society, but science has been providing more evidence about the risks they pose to human health. The health risks for people exposed to urban air toxics at sufficiently high concentrations or lengthy durations include an increased risk for getting cancer or experiencing other serious health effects. These health effects can include damage to the immune system, as well as neurological, reproductive, developmental, respiratory and other health problems.

To better understand the harmful effects road sources of urban air toxics have on human health, in 1996 the EPA developed a list of 22 mobile source air toxics (MSAT), such as acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein and 1,3-butadiene, and assessed the risks of various kinds of exposures to these pollutants on human health. In July 1999, the EPA published a strategy to reduce urban air toxics. In March 2001, the EPA issued regulations for the producers of urban air toxics to decrease the amounts of these pollutants by target dates in 2007 and 2020. Under these regulations, between 1990 and 2020, on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde will be reduced by 67 to 76 percent, and on-highway diesel particulate matter emissions will be reduced by 90 percent. These reductions are due to the impacts of national mobile source control programs, including the reformulated gasoline program, a new cap on the toxics content of gasoline, the national low emission vehicle standards, the Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and the heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. These are net emission reductions, that is, the reductions that will be experienced even after growth in VMT is taken into account.

The EPA has not yet determined how best to evaluate the impact of future roads and intersections on the ambient concentrations of urban air toxics. There are no standards for mobile source air toxics and there are no tools to determine the significance of localized concentrations or of increases or decreases in emissions. Without the necessary standards and tools, FHWA believes that it cannot analyze the specific impacts of roadway projects in any meaningful way. With the information currently available, all that can be concluded is that 1) there are likely to be localized concentrations of air toxics along the new or widened highway that are similar to those experienced by existing residences at similar distances from other similar roadway corridors, and 2) regardless of the alternative chosen, emissions in the project area will decrease over time due to EPA's national control programs.

While there are currently no quantitative tools to assess the project's air toxics impact, potential impacts from the project can be assessed by qualitatively comparing the build scenario to the no-build scenario. The project would not cause any additional negative air toxics impact, based on the following comparisons:

(a) There will not be any substantial increase in diesel truck traffic in the build scenario compared to the no-build scenario.
(b) The build scenario would reduce congestion levels and stop-and-go conditions and change them into more free-flow conditions, and should therefore decrease the acceleration events that cause the highest per-vehicle exhaust emissions.

SECTION 5.0
ANALYSES ONLY REQUIRED FOR CEQA

This section contains additional analysis pursuant to CEQA. The analysis is not required for the EIS in accordance with FHWA regulations.

5.1 REGIONAL AND SUBREGIONAL IMPACTS

The assessments of regional and subregional impacts are important for several reasons. Regional assessments provide information on which direction the air contaminant emissions will trend with a particular project alternative. Simply stated, will the project alternative result in an increase or decrease in pollutants? The regional analysis also attempts to provide some perspective on whether the changes in pollutants are large or small. Are the changes for a project alternative substantial or are they so small as to be insignificant? For a project with many alternatives, such as SOCTIIP, the regional analysis also provides a relative ranking for the many alternatives being considered; identifying which alternatives would result in the greatest increase emissions and the lowest emissions. Finally, the regional analysis provides insight into how other planning programs may affect the eventual emissions generated, and how important it is to factor into the decision making process the uncertainty of future plans into the final decision. For example, does the buildout of the MPAH versus construction of committed roadways affect the air quality consequences of SOCTIIP? The regional analysis in this report examines regional emissions with the completion of the Master Plan of Arterial Highways and also with only the traffic network constructed with the commitments in place today.

The SCAQMD recommends that regional air analysis be conducted as part of CEQA EIRs in SCAB. The "CEQA Air Quality Handbook" (SCAQMD, November 1993) provides general guidance on evaluating regional impacts (or operational impacts as they are identified in the Handbook).

5.1.1 BACKGROUND

Potential long term air quality impacts are commonly divided into "regional" and "local" impacts. The air pollutant that exceeds the ambient air quality standards most often in Southern California is ozone (O_3), which is a regional air pollutant. As already discussed, ozone is not directly emitted into the atmosphere, but rather it is formed in the atmosphere through a very complex series of chemical reactions. Pollutants such as hydrocarbons (HC) and nitrogen oxides (NOx) are directly emitted from cars, trucks, airplanes, and other combustion processes. These are the primary chemicals that react to form ozone. It may take many hours for these pollutants to mix and react to form ozone. The chemical and dispersion processes are simply too complex to predict what increase in ozone (and other regional pollutants) will occur with a given increase in emissions of hydrocarbons and nitrogen oxides. Therefore, the accepted procedure to assess regional impacts is to forecast the pollutants that will be directly emitted. These quantities are then compared to significance thresholds and to region wide emission levels to get an indication of whether these emissions will result in a significant adverse regional air quality impact.

The project is located primarily in the South Coast Air Basin (SCAB), which includes Los Angeles County, Orange County, and the non-desert portions of San Bernardino and Riverside Counties. An air basin is defined as a region that shares in the impact of pollutant releases. Pollutants that are emitted in Los Angeles County can be the primary determinant of air quality in Riverside County or Orange County. Pollutants released in Orange County will not only affect Orange County, but can have an effect on the regional air quality throughout much of the SCAB.

Regional emission forecasts have been made for the SCAB as part of the 1997 Air Quality Management Plan (AQMP). The emissions were forecasted for hydrocarbons (also referred to as volatile organic compounds or VOC), carbon monoxide, nitrogen oxides, and respirable particulate (PM10). Emission forecasts past 2010 are not available. The "1999 Amendment to the 1997 Ozone SIP Revision for the South Coast Air Basin" changed the projections for hydrocarbons and nitrogen oxides slightly, but for consistency among all the pollutants only data from the 1997 AQMP are presented in Table 5-1.

TABLE 5-1A
Regional Emissions for the South Coast Air Basin

	Year		
	2000	**2006**	**2010**
Kilograms Per Day			
HC	850,031	782,900	761,127
CO	4,664,740	3,864,604	3,531,667
NOx	830,981	696,717	659,523
PM10	400,068	411,862	420,026
Pounds Per Day			
HC	1,874,000	1,726,000	1,678,000
CO	10,284,000	8,520,000	7,786,000
NOx	1,832,000	1,536,000	1,454,000
PM10	882,000	908,000	926,000

Source: 1997 AQMP, Tables 3-5, 3-6, and 3-7.

The data show that sizable emission reductions will occur within the basin for the emissions of hydrocarbons, carbon monoxide, and nitrogen oxides. However, the emissions of PM10 are projected to increase slightly through year 2010. It should be noted that many assumptions are necessary for SCAG and SCAQMD to develop the regional forecasts contained in the AQMP. Assumptions particularly relevant to this project are that the forecasts assume the construction of a transportation corridor which connects to the I-5 Freeway, and development of Rancho Mission Viejo (RMV) at 21,000 dwelling units (dus).

TABLE 5-1B
Regional Emissions for the San Diego Air Basin

	Year			
	2001	**2005**	**2010**	**2014**
Kilograms Per Day				
HC	200,305	172,092	160,752	154,856
NOx	218,358	198,128	174,269	151,862
Pounds Per Day				
HC	441,600	379,400	354,400	341,400
NOx	481,400	436,800	384,200	334,800

Source: Ozone Redesignation Request, SDCAPCD, December 2002.

The data show that sizable emission reductions will also occur within the San Diego air basin for the emissions of hydrocarbons and nitrogen oxides. Emissions for other air pollutants have not been forecasted by the SDCAPCD.

The subregional emission forecasts presented in the following sections were developed with the methodology described in Section 3.6.2. To recap briefly, the traffic study forecasts the vehicle miles traveled (VMT) for the study area. The study area roughly encompasses most of south Orange County. The study area encompasses the Cities of Mission Viejo, San Juan Capistrano and San Clemente, and portions of the Cities of Rancho Santa Margarita, Laguna Hills, Laguna Niguel and Dana Point. Also included is the unincorporated portion of Orange County from Rancho Santa Margarita to San Clemente which encompasses the communities of Las Flores, Ladera, and the Rancho Mission Viejo (RMV) area. (For more information refer to the "SOCTIIP Traffic and

Circulation Technical Report," and especially, Figure ES-1.) Traffic speeds are also projected in the traffic study. Speeds and VMT are projected for arterial roadways and for the freeways/tollways. Emission factors, which represent the emissions per mile for a typical vehicle, are multiplied times the VMT to determine the total traffic emissions for the study area or subregion. Changes in VMT and travel speeds affect the amount of emissions generated. To understand the causes of emission changes, a basic understanding of emission factors is necessary.

Emission factors will decrease substantially for most pollutants over the next couple of decades due to laws passed at both the state and federal level. Newer, cleaner burning cars and trucks will gradually replace the older vehicles. Additionally, the emission control laws become more stringent in future years. Graphs of emission factors are presented Figure 5-1. They represent the emission factors for arterial roadways at 35 mph (58 kph). HC, NOx, and PM10 emission factors are presented in the graphs on the left, and CO is presented in the graphs on the right. As can be seen from the graphs, the emission rates for motor vehicles will decrease dramatically in future years for HC, NOx and CO. PM10 emission rates will only decrease slightly. The AQMP emission forecasts presented above, show substantial declines in regional emissions. A large part of those declines in regional emissions will be due to the decrease in motor vehicle emission rates.

The emission rates for most pollutants vary depending on the speed of the motor vehicle. In Figure 5-1, speed versus emission rates are presented for a representative case. (Specifically, the case is for the traffic mix on the corridor for a year post-2020.) The lowest emission rate occurs when the speeds are in the 30 to 40 mph range (50 kph to 67 kph). For NOx the emissions are twice as high for a vehicle traveling at 65 mph (108 kph) than at 35 mph (58 kph). Similarly, the emissions for CO also double for a vehicle traveling at 65 mph (108 kph) in comparison to 40 mph (67 kph). In other words, a vehicle that travels 1 mile at 65 mph will emit twice as much CO and NOx than if it was traveling 40 mph. The effect of speed is much less pronounced for HC and PM10. In fact, PM10 changes very little with speed. It should also be noted that the emission factors, particularly for CO, increase with slower speeds. It is these slow speeds (less than 20 mph or 33 kph) and corresponding high emission rates that can lead to high concentrations of pollutants near congested intersections.

In the following sections subregional emission changes are presented for the project alternatives. <u>Emissions for all toll conditions represent both the Initial and Ultimate Corridor configurations.</u> This is true for all the years assessed (i.e., years 2008, 2018 and 2025). The level of service is optimal on the tollway alternatives, and speeds will essentially be the same for both Initial and Ultimate configurations of the corridor alternatives. The primary difference between the Initial and Ultimate Configurations is the number of lanes. Generally, the Initial Configurations will have four lanes (with the potential to add two HOV lanes) while the Ultimate Configurations is primarily an eight lane facility (including two HOV lanes). The traffic forecasts through the year 2025 show that the Initial Configurations will accommodate the traffic demand without congestion. Since there is no congestion on either of the corridor configurations, the drive times on both configurations would be the same, and drivers would not chose to drive on one configuration and not with the other configuration. Therefore, the "Traffic and Circulation Technical Report" (Austin Foust and Associates, August 2002) projects the same traffic data (i.e., VMT, VHT, speeds, etc) for the two configurations, and this traffic study should be consulted for further information.

Emissions for toll-free conditions are also presented in the following sections. Toll-free conditions represent all of the corridors being toll-free. Therefore, for toll-free conditions, emissions changes are a result of all corridors being toll-free, and not just the proposed project. That is, the existing tollways will become toll free, as well as the corridor alternative being evaluated.

The following regional and subregional analyses focus on the primary pollutants of hydrocarbons (HC), nitrogen oxides (NOx), respirable particulate (PM10), and carbon monoxide (CO). Questions are often raised about diesel toxics or diesel soot, and PM2.5. In recent years, diesel soot has been identified as a carcinogenic compound. However, the tools simply are not available at this time to evaluate concentrations of diesel soot and no ambient air quality standards (AAQS) for diesel soot have been set by any regulatory agency. The best indicators at this time are the HC and PM10 emissions. Diesel soot is comprised primarily of hydrocarbons and is commonly in a particulate form. So both of these emissions relate to the levels of diesel soot. Therefore, the trends that are indicated in the following analysis for HC and PM10 would also be indicative of the trends for diesel soot.

The EPA established PM2.5 emission standards in 1997 which were challenged in court. In February 2001, the Supreme Court upheld the standards but remanded some issues back to the Circuit Court. In March 2002, the Circuit Court upheld the standards. Establishment of a PM2.5 standard was just the first step in the assessment and reduction of PM2.5 levels. Tools need to be developed to accurately estimate PM2.5 and precursor emissions, their dispersion and atmospheric interactions and resulting concentrations. This is difficult because PM2.5 emissions are both directly emitted from sources as well as formed in the atmosphere as other pollutants react chemically in a similar manner to ozone. Uncertainty brought by the court challenge delayed development of the tools to estimate PM2.5 emissions and concentrations especially at a project level.

The focus at this time is establishment of a PM2.5 measurement network to determine which areas are in attainment of the standard and which are not and how substantial the concentrations are in areas of nonattainment. Multiple federal and state agencies are working on methods to estimate emission inventories for regional assessments, dispersion methods and methods for estimating emissions at a project level. At this time adequate tools are not available to perform a detailed assessment of PM2.5 emissions and impacts at the project level. Further, there are no good references to determine significance thresholds for PM2.5 emissions. As the extent of violations and sources of PM2.5 concentrations are investigated, it is anticipated that thresholds will be developed. Until tools and methodologies are developed to assess the impacts of projects on PM2.5 concentrations the analysis of PM10 will need to be used as an indicator of potential PM2.5 impacts. PM10 concentrations (particulates with a size of less than 10 micrometers) include PM2.5 (particulates with a size of less than 2.5 micrometers) emissions. As the net PM10 emissions with the SOCTIIP build alternatives are projected to be less than the significance thresholds (shown in the following sections) it is assumed that PM2.5 emissions due to the project will also not be significant.

Methodology

In the following sections regional and subregional impacts are assessed for a number of scenarios. A number of scenarios for each SOCTIIP alternative based on different assumptions with respect to future land use development and circulation system improvements. The purpose of analyzing multiple scenarios for each alternative is to provide an understanding of how in general the regional air quality responds to the various alternatives under different development conditions, and to identify how the impacts of each alternative vary under different future scenarios. The analysis scenarios are explained in greater detail in Section 2.2 of the "Traffic and Circulation Technical Report," by Austin Foust and Associates, August 2002.

The tables in this section represent both regional and subregional emission changes. To clarify further, the analyses examine the change in roadway network emissions. The roadway network does not extend through the entire SCAB and SDAB, but rather only a portion or subregion of those basins. Therefore, these changes in emissions can be characterized as subregional emissions because they are based on a subregion of the air basins. However, the traffic network extends out far enough so that changes in traffic patterns are miniscule outside of the traffic network, and therefore, the subregional changes in emissions also represent the change in regional emissions. Since "regional" emissions is the more common term, we have used this term instead of the more cumbersome phase of "subregional and regional" emissions in the following sections.

The SOCTIIP build alternatives have the potential for changing subregional travel patterns. In some cases, a SOCTIIP build alternative may provide a shorter travel route and, therefore, reduce total vehicle miles traveled (VMT). Many of the SOCTIIP build alternatives have the potential to remove vehicles off surface roads and onto the tollway where they will be traveling at a much higher speed. The Traffic and Circulation Technical Report (Austin-Foust Associates, Inc., August 2002) forecasts the daily VMT and speed for two categories; arterial roadways and freeways/tollways. Within each of these categories the VMT and speeds are reported for the peak morning period, peak afternoon period and for off-peak hours. Emissions are simply the product of the number of vehicle miles traveled and the corresponding vehicular emission factor. The emission factor will depend on the vehicular speed and year being calculated.

Emission factors to estimate the vehicular emissions were obtained from the California Air Resources Board (CARB). CARB releases emission factors via a large computer database called EMFAC. The emission factors version EMFAC2002 was used. EMFAC2002 is the most current database available. It was used for the Draft 2003 AQMP. Some concern has been expressed that the currently adopted AQMP is based on the EMFAC7G factors, and therefore, the regional emission evaluation should be conducted with the EMFAC7G. A regional/subregional analysis was conducted with the EMFAC7G database is provided as an Appendix to this report. The emission factors are multiplied times the vehicle miles traveled (VMT) for each speed group to determine the total emissions. It should be emphasized that the emissions presented in the following sections represent the traffic roadway network used in the traffic model (Austin-Foust Associates, Inc., August 2002). The traffic network roughly extends from El Toro Road at the northern end to Basilone Road at the southern end. Consult the "SOCTIIP Traffic and Circulation Report," by Austin Foust and Associates for more details. The traffic model is a regional model, and is sometimes referred to as "coarse," meaning that not every roadway is included in the model. All the major roadways in the area are included in the modeling. The real value of the existing emissions forecast is to provide a baseline of comparison for future scenarios. The approach provides a system where different scenarios can fairly accurately be contrasted and compared with one another.

The San Diego Air Pollution Control District has not developed significance thresholds for roadway projects. Since the bulk of emissions from all of the SOCTIIP alternatives occur in the SCAB, it is most appropriate to compare the resulting emissions to SCAQMD thresholds. Further, emissions were not split between those occurring in San Diego County and Orange County. Pollutants do travel across the county line, and separating the emissions by county may underestimate the potential impact of the project alternatives.

5.1.2 FAR EAST CORRIDOR ALTERNATIVES

The change in subregional and regional emissions between existing conditions and future conditions is of primary concern. It answers the basic question of whether or not the regional air quality will improve in future years. Table 5-2 presents the emissions for the Far East Corridor Complete Alternatives (FEC) in comparison to the existing emissions. It should be noted again, that for all project alternatives, the Ultimate and Initial Configurations result in the same regional emissions. Therefore, throughout this analysis when a corridor is referred to such as the FEC, the results apply equally to the Ultimate and Initial Configurations. Similarly, the traffic consultant (Austin-Foust and Associates) has determined that the traffic forecasts for the FEC will be essentially the same for the Far East Corridor West Alternatives (FEC-W) and the Far East Corridor – Modified Alternatives (FEC-M). Therefore all the emission projections and impacts apply equally to the FEC, as well as, the FEC-W and the FEC-M.

The opening day (i.e., year 2008), 2018, and 2025 conditions are assessed. Additionally, a toll-free scenario for 2025 was assessed. Again, all toll-free conditions represent an Ultimate Configuration only. The last two columns present a sensitivity check by looking at different assumptions for the roadway network and for the development of

Rancho Mission Viejo (RMV). It should be noted that SCAG has used the RMV at 21,000 dus in their regional forecasts. (Numbers in the column headings, such as 6A, represent the traffic scenario number.) The following tables in this section represent both regional and subregional emission changes. To clarify further, the analyses examine the change in roadway network emissions. The roadway network does not extend through the entire SCAB and SDAB, but rather only a portion or subregion of those basins. Therefore, these changes in emissions can be characterized as subregional emissions because they are based on a subregion of the air basins. However, the traffic network extends out far enough so that changes in traffic patterns are miniscule outside of the traffic network, and therefore, the subregional changes in emissions also represent the change in regional emissions. Since "regional" emissions is the more common term, we have used this term instead of the more cumbersome phase of "subregional and regional" emissions throughout this subsection.

TABLE 5-2
Traffic Emission Changes In Comparison to Existing Emissions
(Values in Bold Represent Significant Increases in Emissions)

		Far East Corridor Complete (FEC) Versus Existing					
		Year 2008; Committed Network (6a)	Year 2018; Committed Network (6b)	Year 2025 Committed; RMV @ 14,000 DU (6)	Year 2025 MPAH/RTP; RMV @ 14,000 DU (7)	Year 2025 MPAH/RTP; RMV @ 21,000 DU (8)	Year 2025 Toll Free MPAH/RTP; RMV @ 21,000 DU (41)
HC	kg./day	-40,790	-67,127	-73,904	-73,904	-73,862	-73,892
	lbs./day	-89,927	-147,991	-162,930	-162,930	-162,839	-162,904
CO	kg./day	-634,366	-1,153,408	-1,327,531	-1,327,586	-1,327,165	-1,327,760
	lbs./day	-1,398,539	-2,542,831	-2,926,707	-2,926,828	-2,925,901	-2,927,213
NOx	kg./day	-189,824	-367,233	-418,177	-418,159	-418,113	-417,999
	lbs./day	-418,491	-809,610	-921,924	-921,885	-921,781	-921,530
PM10	kg./day	**1,402**	**2,694**	**4,360**	**4,360**	**4,377**	**4,362**
	lbs./day	**3,092**	**5,938**	**9,613**	**9,612**	**9,649**	**9,616**

Note: Numbers in the column headings, such as 6A, represent the traffic scenario number.
Existing emissions are presented in Table 3-8.

<u>The amount of HC, CO, and NOx emissions decrease dramatically in future years.</u> The regional air quality indicated by the traffic emissions will be better in future years than for existing conditions. HC emissions will be nearly 41,000 kilograms per day (90,000 lbs. per day) less in the 2008 than with current conditions. By 2025, the reduction in emissions over current conditions will be over 73,000 kilograms per day (160,000 lbs. per day) of HC. Reductions in CO by 2025 will be well over 1.3 million kilograms per day,

and NOx will have been reduced by roughly 418,000 kilograms per day (920,000 lbs. per day). These substantial decreases in regional traffic emissions will occur because the emission rates will be lower in future years. The use of cleaner cars, which is mandated by state and federal laws, will continue to reduce the emission rates from motor vehicles dramatically. VMT in the study area will increase by more than 35% between existing conditions and 2025, but the use of cleaner vehicles will more than offset this increase in traffic and will result in the dramatic decreases in regional emissions shown in Table 5-2.

PM10 emission rates are not projected to decrease in future years as rapidly as the other pollutants, and therefore, the regional emissions are not anticipated to decrease in future years. The PM10 emission levels by 2025 will be over 4,000 kilograms per day (8,800 lbs. per day) higher than for existing conditions. The PM10 emissions increase primarily due to the increases in VMT between existing and 2025. The emission rates for PM10, unlike the other pollutants, do not decrease rapidly in future years for the newer vehicles. The increases in PM10 emissions over existing conditions will be higher than the SCAQMD threshold of significance for PM10.

The changes in regional emissions due to the various Far East Corridor Alternatives are presented in Table 5-3. The previous table, Table 5-2, showed the emission changes that would occur for the subregion between now and the Year 2025. The changes in emissions shown in Table 5-2 are dependent on many things such as the regional growth in traffic and the use of cleaner cars, in addition to the development of a project alternative. The changes in emissions presented in the Table 5-3 represent the difference in emissions that would result with the project alternative in comparison to the corresponding No Action Alternative. The data in Table 5-3, therefore, look at a single timeframe (e.g., year 2025) and represent the emission changes directly associated with a project alternative. Alternatives presented include the Far East Corridor Complete Alternatives, and the sub-alternatives or variations including the Talega Variation (FEC-TV), Cristianitos Variation (FEC-CV), Ortega Highway Variation (FEC-OHV), and the Avenida Pico Variation (FEC-APV). For each alternative, emissions changes are presented based on varying land use and roadway network assumptions. All alternatives were evaluated assuming that Rancho Mission Viejo (RMV) would be developed with 14,000 dwelling units. All alternatives were evaluated assuming both a committed roadway network and a built out roadway network per the Master Plan of Arterial Highways (MPAH) and the Regional Transportation Plan (RTP). Additionally, the FEC and the FEC-TV were assessed with Rancho Mission Viejo assumed to be developed at 21,000 dwelling units. It should be emphasized that the values presented in the following tables represent the change in emissions in comparison to the corresponding No Action scenario. Therefore, the first column of values represents the change in emissions between the FEC (with the committed roadway network and RMV at 14,000 dwellings) and the No Action Alternative (with the committed roadway network and RMV at 14,000 dwellings). A negative number indicates that the emissions would be less with the corridor alternative. Values that are bolded indicate that an increase greater than the SCAQMD significance thresholds (refer to Section 7.3 for thresholds) would occur with the proposed corridor alternative.

TABLE 5-3
Regional Traffic Emission Changes In Comparison
To the Corresponding No Action Alternative
(Values in Bold Represent Significant Increases in Emissions)

		Far East Complete (FEC)			Talega Variation (FEC-TV)		
		Committed; RMV @ 14,000 DU (6)	MPAH/RTP; RMV @ 14,000 DU (7)	MPAH/RTP ; RMV @ 21,000 DU (8)	Committed; RMV @ 14,000 DU (9)	MPAH/RTP; RMV @ 14,000 DU (10)	MPAH/RTP; RMV @ 21,000 DU (11)
HC	kg./day	-35	-29	-34	-34	-28	-33
	lbs./day	-77	-63	-75	-74	-62	-73
CO	kg./day	-1123	-810	-958	-1022	-726	-851
	lbs./day	-2,475	-1,785	-2,111	-2,252	-1,601	-1,876
NOx	kg./day	**61**	**26**	**77**	**53**	14	**65**
	lbs./day	**136**	**58**	**170**	**117**	30	**142**
PM10	kg./day	2	0	2	1	-2	0
	lbs./day	5	-1	4	2	-3	0

		Cristianitos Variation (FEC-CV)		Ortega Highway Variation (FEC-OHV)		Avenida Pico Variation (FEC-APV)	
		Committed; RMV @ 14,000 DU (12)	MPAH/RTP; RMV @ 14,000 DU (13)	Committed; RMV @ 14,000 DU (14)	MPAH/RTP; RMV @ 14,000 DU (15)	Committed; RMV @ 14,000 DU (16)	MPAH/RTP; RMV @ 14,000 DU (17)
HC	kg./day	-29	-24	-9	-9	-24	-18
	lbs./day	-63	-52	-20	-19	-54	-41
CO	kg./day	-899	-643	-167	-148	-697	-432
	lbs./day	-1,981	-1,417	-368	-327	-1,537	-952
NOx	kg./day	**49**	13	-6	-8	**25**	-1
	lbs./day	**109**	30	-14	-19	**56**	-1
PM10	kg./day	2	0	-2	-2	0	-2
	lbs./day	5	-1	-5	-5	0	-4

None of the Far East Corridor Alternatives exceed the SCAQMD thresholds for hydrocarbons (HC), carbon monoxide (CO), or respirable particulate (PM10). In fact, the Far East Corridor Alternatives result in large decreases of CO. HC emissions are projected to go down slightly for all alternatives in comparison to the No Action Alternatives. PM10 emissions are projected to remain essentially the same for all alternatives in comparison to the No Action alternatives.

Many of the Far East Corridor Alternatives exceed the SCAQMD thresholds for nitrogen oxides (NOx). The FEC Alternatives exceed the thresholds for NOx with both the committed roadway network and the buildout of the roadway network. The FEC-TV, FEC-CV, and FEC-APV Alternatives only exceed the threshold levels with the committed network, but not with the buildout network.

It is important to understand why some emissions increase and other emissions decrease. The primary reason for increased NOx emissions is tied to travel speeds. As discussed in Section 5.1.1, the emissions are lowest for NOx at travel speeds around 40 mph (67 kph). The emission rates for NOx are about 25% higher at speeds of 60 mph (100 kph). With the corridor alternatives, a large number of vehicles will be attracted from the arterial roadways where their average travel speeds are in the low 20 mph (33kph) range, and instead will drive on the corridor where the travel speed will be above 60 mph (100 kph) much of the time. The NOx emissions for these cars are essentially increased by about 20% since they are traveling at a higher speed that has emission rates that are substantially higher. Emission rates for HC and CO are near their lowest at around 60 mph (100 kph). Therefore, redistributing vehicles from the arterial roadways to the tollway results in reductions in HC and CO emissions, but increases in NOx emissions. Other factors also contribute to the final emission totals, but play a secondary role in the emissions forecasted. These include the total vehicle miles traveled (VMT) for vehicles in the network. For the FEC Alternatives, for example, the total VMT increases slightly in comparison to the No Action alternative. Increases in VMT push the total emissions up. Average speeds on arterial roadways and freeways/tollways also change slightly, and these changes in speed can also affect the emissions generated.

The amount of NOx emissions generated varies substantially among the different alternatives. The lowest forecast (with RMV at 14,000 du) is for the FEC-OHV (a decrease of 8 kg/day or 19 lbs/day of NOx) and the highest is for the FEC (an increase of 61 kg/day or 136 lbs/day of NOx). Between these two alternatives, listed in increasing emissions order, are the FEC-APV, the FEC-CV, and the FEC-TV. Why does the FEC-OHV result in the lowest NOx emissions and the FEC Alternatives in the highest? The reasons are similar to those discussed above. The primary reason is that the FEC pulls more cars off of the arterial roadway network (low speeds, low NOx emission rates), and puts them on the corridor (higher speeds, higher NOx emission rates) than does the FEC-OHV.

For all alternatives, both a committed roadway network and a buildout (MPAH/RTP) roadway network were considered. Increases of regional NOx emissions were less with the buildout network than with the committed network.

Both the FEC and the FEC-TV Alternatives were assessed with Rancho Mission Viejo developed at both 14,000 dwellings and at 21,000 dwellings. The emission increases in comparison to the corresponding No Action Alternatives were less with the Rancho Mission Viejo developed at the higher development rate of 21,000 dwellings for HC and CO emissions, and are more for NOx and PM10 emissions. This does not mean that the regional emissions would be less with Rancho Mission Viejo at 21,000 dwellings than at 14,000 dwellings. (The Far East Corridor Alternatives with 14,000 dwellings are compared to the No Action Alternative with 14,000 dwellings. Similarly, the Far East Corridor Alternatives with 21,000 dwellings are compared to the No Action Alternative with 21,000 dwellings.) The traffic forecasts show that the relative amount of traffic moving from the arterial roadways to the corridor/freeway network is less with the higher level of development than with the lower level of development.

Table 5-4 presents the results of analyses further examining interim years and the toll versus toll free conditions for the FEC Alternatives. Similar results would occur with the other Far East Corridor variations. For the FEC Alternatives, changes in emissions in comparison to the corresponding No Action Alternatives are presented for 2008 (opening year), 2018, and 2025. The emissions for each of these cases are similar. NOx emissions increase in comparison to the No Action Alternatives and the increases substantially exceed SCAQMD thresholds for all years. Emissions of HC and CO are substantially less than the No Action Alternatives for all years. PM10 emissions are about the same with or without the project. As discussed previously, the NOx emissions are higher and HC and CO emissions are lower because with the corridor more vehicles will be traveling at high speeds.

TABLE 5-4
Regional Traffic Emission Changes In Comparison to the Corresponding No Action Alternative
(Values in Bold Represent Significant Increases in Emissions)

		Far East Complete (FEC)				
		Year 2008 Committed; RMV @14,000 DU (6a)	Year 2018 Committed; RMV @14,000 DU (6b)	Year 2025 Committed; RMV @ 14,000 DU (6)	Year 2025 MPAH/RTP: RMV@ 21,000 DU (8)	Year 2025 Toll Free MPAH/RTP; RMV @ 21,000 DU (41)
HC	kg./day	-5	-52	-35	-34	-64
	lbs./day	-11	-114	-77	-75	-141
CO	kg./day	-223	-614	-1123	-958	-1553
	lbs./day	-491	-1354	-2475	-2111	-3423
NOx	kg./day	**143**	**118**	**61**	**77**	**191**
	lbs./day	**315**	**259**	**136**	**170**	**422**
PM10	kg./day	-2	-11	2	2	-13
	lbs./day	-4	-24	5	4	-29

The last two columns provide a comparison between toll and toll-free conditions. The emissions are higher for NOx with the toll-free condition, and lower for the other pollutants with the toll-free condition. With the toll-free conditions, more vehicles are traveling at high speeds and this results in increased NOx emissions and lower HC and CO emissions. The regional increase in NOx emissions for both the toll and toll-free conditions are above the SCAQMD thresholds of significance.

In summary, the regional traffic emissions will decrease substantially in future years. The reduction in emissions will occur with or without the project. The decrease will be due to the use of cleaner vehicles in future years which is mandated by state and federal laws.

In comparison to the No Action Alternatives, the Far East Corridor Alternatives, except the FEC-OHV, will result in substantial increases in NOx emissions if only the committed roadway network is constructed. If the roadway network were built out as envisioned in the MPAH/RTP, then substantial increases in NOx emissions would only occur with the FEC Alternatives. Emissions of HC and CO go down with the operation of all of the Far East Corridor Alternatives. PM10 emissions are essentially unchanged. The Far East Corridor Alternatives result in many vehicles which travel on the arterial roadways for the No Action Alternative traveling on the corridors at a higher speed with the project alternatives. More travel at higher speeds is primarily responsible for the increase in NOx emissions and the decreases in HC and CO emissions. The emissions are highest for the FEC Alternatives and are the lowest for the FEC-OHV Alternatives.

5.1.3 CENTRAL CORRIDOR ALTERNATIVES

The change in subregional and regional emissions between existing conditions and future conditions is of primary concern. This comparison is the key indicator of whether the regional air quality will improve in future years. Table 5-5 presents the emissions for the Central Corridor Complete (CC) Alternatives (both the Initial and Ultimate Alternatives) in comparison to the existing emissions. Similar results will occur with the other Central Corridor alternatives. The opening day (i.e., year 2008), 2018, and 2025 conditions are assessed. Additionally, a toll-free scenario, CC – Ultimate Alternative, for 2025 was assessed. The last two columns present a sensitivity check by looking at different assumptions for the roadway network and for the development of Rancho Mission Viejo (RMV). (Numbers in the column headings, such as 18a, refer to the traffic scenario number.) The following tables in this section represent both regional and subregional emission changes. To clarify further, the analyses examine the change in roadway network emissions. The roadway network does not extend through the entire SCAB and SDAB, but rather only a portion or subregion of those basins. Therefore, these changes in emissions can be characterized as subregional emissions because they are based on a subregion of the air basins. However, the traffic network extends out far enough so that changes in traffic patterns are miniscule outside of the traffic network, and therefore, the subregional changes in emissions also represent the change in regional emissions. Since "regional" emissions is the more common term, we have used this term instead of the more cumbersome phase of "subregional and regional" emissions throughout this subsection.

TABLE 5-5
Traffic Emission Changes In Comparison to Existing Emissions
(Values in Bold Represent Significant Increases in Emissions)

		Central Corridor Complete (CC) Versus Existing					
		Year 2008 Committed Network (18a)	Year 2018 Committed Network (18b)	Year 2025 Committed; RMV @ 14,000 DU (18)	Year 2025 MPAH/RTP; RMV @ 14,000 DU (19)	Year 2025 MPAH/RTP; RMV @ 21,000 DU (20)	Year 2025 Toll Free MPAH/RTP; RMV @ 21,000 DU (42)
HC	kg./day	-40,789	-67,115	-73,901	-73,900	-73,858	-73,888
	lbs./day	-89,923	-147,964	-162,925	-162,923	-162,829	-162,895
CO	kg./day	-634,367	-1,153,302	-1,327,446	-1,327,481	-1,327,034	-1,327,616
	lbs./day	-1,398,541	-2,542,598	-2,926,519	-2,926,597	-2,925,611	-2,926,895
NOx	kg./day	-189,784	-367,213	-418,181	-418,161	-418,139	-418,029
	lbs./day	-418,403	-809,566	-921,933	-921,888	-921,840	-921,597
PM10	kg./day	**1,403**	**2,696**	**4,360**	**4,360**	**4,376**	**4,360**
	lbs./day	**3,092**	**5,944**	**9,611**	**9,611**	**9,647**	**9,612**

Note: Existing emissions are presented in Table 3-8.

<u>The amount of HC, CO, and NOx emissions decrease dramatically in future years.</u> The regional air quality indicated by the traffic emissions will be better in future years than for existing conditions. HC emissions will be nearly 41,000 kilograms per day (90,000 lbs. per day) less in the 2008 than with current conditions. By the 2025, the reduction in emissions over current conditions will be almost 74,000 kilograms per day (163,000 lbs. per day) of HC. Reductions in CO by 2025 will be well over 1.3 million kilograms per day (2,900,000 lbs. per day), and NOx will have been reduced by roughly 418,000 kilograms per day (920,000 lbs. per day). These huge decreases in regional traffic emissions will occur because the emission rates will be lower in future years. The use of cleaner cars, which is mandated by state and federal laws, will continue to reduce the emission rates from motor vehicles dramatically. In fact, it should be noted that the traffic forecast shows that the VMT in the study area will increase by more than 35% between existing conditions and 2025. However, the use of cleaner vehicles will more than offset this increase in traffic and will result in the huge decreases in regional emissions shown in Table 5-5.

PM10 emission rates are not projected to decrease in future years as rapidly as the other pollutants, and therefore, the regional emissions are not anticipated to decrease in future years. In fact, the PM10 emission levels by 2025 will actually be over 4,000 kilograms per day (8,800 lbs. per day) higher than for existing conditions. The increases in PM10 emissions over existing conditions will be higher than the SCAQMD threshold of significance for PM10.

The changes in regional emissions due to the various Central Corridor Alternatives are presented in Table 5-6, with the change in emissions representing the difference in emissions that would result with the alternative in comparison to the corresponding No Action Alternative. Alternatives presented include the Central Corridor Complete (CC), the Avenida La Plata Variation (CC-ALPV), and the Ortega Highway Variation (CC-OHV). For each alternative, emissions changes are presented based on varying land use and roadway network assumptions. All alternatives were evaluated assuming that RMV would be developed with 14,000 dus. All alternatives were evaluated assuming a committed roadway network and a built out roadway network per the MPAH and the RTP. Additionally, the CC was assessed with RMV assumed to be developed at 21,000 dus. It should be emphasized that the values presented in the following tables represent the change in emissions in comparison to the corresponding No Action Alternative. Therefore, the first column of values represents the change in emissions between the CC (with the committed roadway network and RMV at 14,000 dwellings) and the No Action Alternative (with the committed roadway network and RMV at 14,000 dwellings). A negative number indicates that the emissions would be less with the corridor alternative. Values that are bolded indicate that an increase greater than the SCAQMD significance thresholds would occur with the proposed alternative.

TABLE 5-6
Central Corridor Alternatives - Regional Traffic Emission Changes
In Comparison To The Corresponding No Action Alternatives
(Values in Bold Represent Significant Increases in Emissions)

		Central Corridor Complete (CC)			Avd. La Plata Variation (CC-ALPV)		Ortega Highway Variation (CC-OHV)	
		Year 2025; Committed; RMV @ 14,000 DU (18)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (19)	Year 2025; MPAH/RTP; RMV @ 21,000 DU (20)	Year 2025; Committed; RMV @ 14,000 DU (21)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (22)	Year 2025; Committed; RMV @ 14,000 DU (23)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (24)
HC	kg./day	-33	-25	-30	-23	-17	-4	-5
	lbs./day	-72	-56	-66	-51	-37	-8	-12
CO	kg./day	-1,037	-705	-826	-690	-418	-87	-127
	lbs./day	-2,287	-1,555	-1,822	-1,521	-922	-193	-281
NOx	kg./day	**58**	**25**	**51**	22	-4	-7	-6
	lbs./day	**127**	**55**	**112**	49	-8	-14	-13
PM10	kg./day	1	0	1	0	-1	-1	-1
	lbs./day	3	-1	1	0	-3	-2	-2

<u>None of the Central Corridor Alternatives exceeds the SCAQMD thresholds for hydrocarbons (HC), carbon monoxide (CO), or respirable particulate (PM10).</u> In fact, the Central Corridor Alternatives result in large decreases of CO. HC emissions are projected to go down slightly for all alternatives in comparison to the No Action Alternatives. PM10 emissions are projected to remain essentially the same for all alternatives in comparison to the No Action alternatives.

Many of the Central Corridor Alternatives exceed the SCAQMD thresholds for NOx. The CC Alternatives exceed the thresholds for NOx with both the committed roadway network and the buildout of the roadway network. The CC-ALPV and CC-OHV Alternatives only do not exceed the threshold levels for either the committed network or the buildout network.

It is important to understand why some emissions increase and other emissions decrease. The primary reason for increased NOx emissions is tied to travel speeds. As discussed in Section 5.1.1, the emissions are lowest for NOx at travel speeds around 40 mph (67 kph). The emission rates for NOx are about 25% higher at speeds of 60 mph (100 kph). With the corridor alternatives a large number of vehicles will be attracted from the arterial roadways where their average travel speeds are in the low 20 mph (33 kph) range, and instead will drive on the corridor where the travel speed will be above 60 mph (100 kph) much of the time. The NOx emissions for these cars are essentially increased by about 20% since they are traveling at a higher speed that has substantially higher emission rates. Emission rates for HC and CO are near their lowest at around 60 mph (100 kph). Therefore, redistributing vehicles from the arterial roadways to the tollway results in reductions in HC and CO emissions, but increases in NOx emissions. Other factors also contribute to the final emission totals, but play a secondary role in the emissions forecasted. These include the total vehicle miles traveled (VMT) for vehicles in the network. Increases in VMT push the total emissions up. Average speeds on arterial roadways and freeways/tollways also change slightly, and these changes in speed can also affect the emissions generated.

The amount of NOx emissions generated varies substantially among the different alternatives. The lowest forecast (with RMV at 14,000 du) is for the CC-OHV (a decrease of 6 kg/day or 13 lbs/day of NOx) and the highest is for the CC (an increase of 58 kg/day or 127 lbs/day of NOx). The CC-ALPV has emissions between these two sets of alternatives. Why do the CC-OHV Alternatives result in the lowest NOx emissions and the CC Alternatives in the highest? The reasons are similar to those discussed above. The primary reason is that the CC pulls more cars off of the arterial roadway network (low speeds, low NOx emission rates), and puts them on the corridor (higher speeds, higher NOx emission rates) than does the CC-OHV.

For all alternatives, both a committed roadway network and a buildout (MPAH/RTP) roadway network were considered. Increases of regional NOx emissions were less with the buildout network than with the committed network.

Both the CC Alternatives were assessed with Rancho Mission Viejo developed at both 14,000 dwellings and at 21,000 dwellings. The emission changes in comparison to the corresponding No Action Alternatives were about the same with the Rancho Mission Viejo developed at the higher development rate of 21,000 dwellings than for 14,000 dwellings. This does not mean that the regional emissions would be less with Rancho Mission Viejo at 21,000 dwellings than at 14,000 dwellings. (The CC Alternatives with 14,000 dwellings are compared to the No Action Alternative with 14,000 dwellings. Similarly, the CC Alternatives with 21,000 dwellings are compared to the No Action Alternative with 21,000 dwellings.)

Table 5-7 presents the result of analyses further examining interim years and the toll versus toll free conditions for the CC Alternatives. Similar results would occur with the other Central Corridor Alternatives. For the CC Alternatives, changes in emissions in comparison to the corresponding No Action Alternative are presented for the years 2008 (opening year), 2018, and 2025. The emissions for each of these cases are similar. HC, CO, and PM10 do not show any significant increases in emissions. In fact, CO emissions decrease very substantially in comparison to the No Action Alternative. NOx emissions substantially exceed SCAQMD thresholds for all years. As discussed previously, the NOx emissions are higher and the HC and CO emissions are lower because with the corridor more vehicles will be traveling at higher speeds.

TABLE 5-7
Central Corridor - Regional Traffic Emission Changes For Intermediate Years And For Toll-Free Conditions
(Values in Bold Represent Significant Increases in Emissions)

		Central Corridor Complete (CC) Alternatives				
		Year 2008 Committed Network (18a)	Year 2018 Committed Network (18b)	Year 2025; Committed; RMV @ 14,000 DU (18)	Year 2025 MPAH/RTP; RMV @ 21,000 DU (20)	Year 2025; Toll Free MPAH/RTP; RMV @ 21,000 DU (42)
HC	kg./day	-3	-40	-33	-30	-30
	lbs./day	-7	-87	-72	-66	-66
CO	kg./day	-224	-509	-1,037	-826	-582
	lbs./day	-493	-1,121	-2,287	-1,822	-1,283
NOx	kg./day	**183**	**138**	**58**	**51**	**110**
	lbs./day	**403**	**303**	**127**	**112**	**242**
PM10	kg./day	-2	-8	1	1	-16
	lbs./day	-4	-19	3	1	-34

The last two columns provide a comparison between toll and toll-free conditions. The emissions are higher for NOx with the toll-free condition, and are lower or about the same for the other pollutants with the toll-free condition. With the toll-free conditions more vehicles are traveling at high speeds and this results in increased NOx emissions and lower HC and CO emissions. The regional increase in NOx emissions for both the toll and toll-free conditions are above the SCAQMD thresholds of significance.

In summary, the regional traffic emissions will decrease substantially in future years. The reduction in emissions will not be due to the proposed project, but will occur with or without the project. The decrease will be due to the use of cleaner vehicles in future years which is mandated by state and federal laws.

In comparison to the No Action Alternatives, the CC Alternatives will result in substantial increases NOx emissions and will result in a regional impact. The other Central Corridor Alternatives (i.e., CC-ALPV and CC-OHV) do not result in any substantial increase in regional emissions. In fact, all Central Corridor Alternatives will result in very substantial reductions of CO and modest reductions of HC. Emissions will be higher for a toll-free condition than for a toll condition.

5.1.4 ALIGNMENT 7 CORRIDOR ALTERNATIVES

The change in subregional and regional emissions between existing conditions and future conditions is of primary concern. This analysis answers the basic question of whether the regional air quality will improve in future years. Table 5-8 presents the emissions for the Alignment 7 Corridor - Far East Crossover Variation (A7C-FECV) Alternatives in comparison to the existing emissions. Similar results will occur with the other Alignment 7 Corridor Alternatives. It should be noted that for all toll-free scenarios, the Ultimate and Initial Configurations result in the same regional emissions. Therefore, throughout this analysis when a toll-free corridor is referred to such as the A7C, the results apply equally to the Ultimate and Initial Configurations. Similarly, the traffic consultant (Austin-Foust and Associates) has determined that the traffic forecasts for the A7C-FECV will be essentially the same for the Alignment 7 Corridor – Far East Crossover - Modified Alternatives (A7C-FEC-M). Therefore all the emission projections and impacts apply equally to the A7C-FECV, as well as the A7C-FEC-M.

The opening day (i.e., year 2008), 2018, and 2025 conditions are assessed. Additionally, a toll-free scenario for 2025 was assessed. The last two columns present a sensitivity check by looking at different assumptions for the roadway network and for the development of Rancho Mission Viejo. The following tables in this section represent both regional and subregional emission changes. To clarify further, the analyses examine the change in roadway network emissions. The roadway network does not extend through the entire SCAB and SDAB, but rather only a portion or subregion of those basins. Therefore, these changes in emissions can be characterized as subregional emissions because they are based on a subregion of the air basins. However, the traffic network extends out far enough so that changes in traffic patterns are miniscule outside of the traffic network, and therefore, the subregional changes in emissions also represent the change in regional emissions. Since “regional” emissions is the more common term, we have used this term instead of the more cumbersome phase of “subregional and regional” emissions throughout this subsection.

TABLE 5-8
Traffic Emission Changes In Comparison to Existing Emissions
(Values in Bold Represent Significant Increases in Emissions)

		Alignment 7 Corridor - Far East Crossover Variation (A7C-FECV) Versus Existing					
		Year 2008; MPAH/RTP; RMV @21,000 DU (29a)	Year 2018; MPAH/RTP; RMV @21,000 DU (29b)	Year 2025 MPAH/RTP; RMV @ 21,000 DU (29)	Year 2025; Toll Free MPAH/RTP; RMV @ 21,000 DU (43)*	Year 2025; Committed; RMV @ 14,000 DU (27)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (28)
HC	kg./day	-40,784	-67,110	-73,853	-73,884	-73,903	-73,902
	lbs./day	-89,913	-147,953	-162,819	-162,886	-162,928	-162,925
CO	kg./day	-634,262	-1,153,225	-1,327,044	-1,327,573	-1,327,559	-1,327,576
	lbs./day	-1,398,309	-2,542,429	-2,925,633	-2,926,799	-2,926,768	-2,926,806
NOx	kg./day	-189,773	-367,198	-418,127	-418,030	-418,171	-418,151
	lbs./day	-418,378	-809,533	-921,814	-921,599	-921,911	-921,865
PM10	kg./day	**1,404**	**2,698**	**4,378**	**4,362**	**4,361**	**4,361**
	lbs./day	**3,094**	**5,948**	**9,653**	**9,616**	**9,614**	**9,613**

*Toll-Free Analysis is for Alignment 7 Corridor Complete (A7C)
Note: Existing emissions are presented in Table 3-8.

The amount of HC, CO, and NOx emissions decrease dramatically in future years. The regional air quality indicated by the traffic emissions will be better in future years than for existing conditions. HC emissions will be about 40,800 kilograms per day (almost 90,000 lbs per day) less in 2008 than with existing conditions. By 2025, the reduction in emissions over current conditions will be over 73,853 kilograms per day (162,819 lbs per day) of HC. Reductions in CO by 2025 will be well over 1.3 million kilograms per day (2.9 million lbs per day), and NOx will have been reduced by roughly 418,000 kilograms per day (922,000 lbs per day). These huge decreases in regional traffic emissions will occur because the emission rates will be lower in future years. The use of cleaner cars, which is mandated by state and federal laws, will continue to reduce the emission rates from motor vehicles dramatically. In fact, it should be noted that the traffic forecast shows that the VMT in the study area will increase by more than 35% between existing conditions and year 2025. However, the use of cleaner vehicles will more than offset this increase in traffic and result in the huge decreases in regional emissions shown in Table 5-8.

PM10 emission rates are not projected to decrease in future years as rapidly as the other pollutants, and therefore, the regional emissions are not anticipated to decrease as in future years. In fact, the PM10 emission levels by 2025 will actually be 4,378 kilograms per day (9653 lbs. per day) higher than for existing conditions. The increases in PM10 emissions over existing conditions will be higher than SCAQMD threshold of significance for PM10.

The changes in regional emissions due to the various Alignment 7 Corridor Alternatives are presented in Table 5-9. The change in emissions in Table 5-9 represent the difference in emissions that would result with the alternatives in comparison to the corresponding No Action Alternative. Alternatives presented include the Alignment 7 Corridor Complete (A7C) Alternatives, and the Far East Crossover Variation (A7C-FECV), and the Far East Crossover - Cristianitos Variation (A7C-FECV-C). For each alternative, emissions changes are presented based on varying land use and roadway network assumptions. All alternatives were evaluated assuming that RMV would be developed with 14,000 dwelling units. All alternatives were evaluated assuming a committed roadway network and a built out roadway network per the MPAH and the RTP. Additionally, the A7C Alternatives were assessed with RMV assumed to be developed at 21,000 dwelling units. It should be emphasized that the values presented in the following tables represent the change in emissions in comparison to the corresponding No Action Alternative. Therefore, the first column of values represents the change in emissions between the A7C (with the committed roadway network and RMV at 14,000 dwellings) and the No Action Alternative (with the committed roadway network and RMV at 14,000 dwellings). A negative number indicates that the emissions would be less with the corridor alternative. Values that are bolded indicate that an increase greater than the SCAQMD significance thresholds would occur with the proposed alternative.

TABLE 5-9
Alignment 7 Corridor - Regional Traffic Emission Changes In Comparison To The Corresponding No Action Alternatives
(Values in Bold Represent Significant Increases in Emissions)

		Alignment 7 Complete (A7C)		Far East Crossover Variation (A7-FECV)			Far East Crossover Cristianitos Variation (A7-FECV-C)	
		Year 2025; Committed; RMV @ 14,000 DU (25)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (26)	Year 2025; Committed; RMV @ 14,000 DU (27)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (28)	Year 2025; MPAH/RTP; RMV @ 21,000 DU (29)	Year 2025; Committed; RMV @ 14,000 DU (30)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (31)
HC	kg./day	-33	-26	-34	-26	-25	-25	-19
	lbs./day	-74	-58	-75	-58	-56	-55	-42
CO	kg./day	-1035	-714	-1150	-800	-836	-857	-580
	lbs./day	-2283	-1575	-2536	-1764	-1843	-1890	-1278
NOx	kg./day	**54**	21	**68**	**35**	**62**	**58**	**26**
	lbs./day	**119**	46	**149**	**78**	**138**	**127**	**57**
PM10	kg./day	1	-1	3	1	3	3	1
	lbs./day	2	-2	6	1	8	7	3

None of the Alignment 7 Corridor Alternatives exceeds the SCAQMD thresholds for HC, CO or PM10. In fact, the Alignment 7 Alternatives result in large decreases of CO. HC emissions are projected to go down, sometimes significantly, for all alternatives in comparison to the No Action Alternatives. PM10 emissions are projected to remain essentially the same for all alternatives in comparison to the No Action alternatives.

Many of the Alignment 7 Corridor Alternatives exceed the SCAQMD thresholds for NOx. The A7C Alternatives exceed the thresholds for NOx for the committed roadway network, but not for the buildout roadway network. The A7-FECV and A7-FECV-C Alternatives exceed the thresholds for both the committed and buildout networks.

It is important to understand why some emissions increase and other emissions decrease. The primary reason for increased NOx emissions is tied to travel speeds. As discussed in Section 5.1.1, the emissions are lowest for NOx at travel speeds around 40 mph (67 kph). The emission rates are about 25% higher at speeds of 60 mph (100 kph). With the corridor alternatives a large number of vehicles will be attracted from the arterial roadways where their average travel speeds are in the low 20 mph (33 kph) range, and instead will drive on the corridor where the travel speed will be above 60 mph (100 kph) most of the time. The NOx emissions for these cars are essentially increased by 20% since they are traveling at a high speed that has emission rates that are substantially higher. Emission rates for HC and CO are near their lowest at around 60 mph (100 kph). Therefore, redistributing vehicles from the arterial roadways to the tollway results in reductions in HC and CO emissions, but increases in NOx emissions. Other factors also contribute to the final emission totals, but play a secondary roll in the emissions forecasted. These include the total vehicle miles traveled (VMT) for vehicles in the network. For the A7C Alternatives, for example, the total VMT increases slightly. Increases in VMT push the total emissions up. Average speeds on arterial roadways and freeways/tollways also change slightly, and these changes in speed can also affect the emissions generated.

The amount of NOx emissions generated varies substantially for the different Alignment 7 Corridor Alternatives. The lowest forecast is for the A7C (21 kg/day or 46 lbs./day of NOx) with the buildout network, and the highest is for the A7-FECV Alternatives (68 kg/day or 149 lbs/day of NOx) with the committed network. The differences between the alternatives when comparing buildout to buildout and committed to committed is very small. That is, for NOx all Alignment 7 Alternatives result in about the same NOx emissions.

For all alternatives, both a committed roadway network and a buildout (MPAH/RTP) roadway network were considered. Increases of regional NOx and CO emissions were less with the buildout network than with the committed network.

For the A7-FECV, a scenario was assessed with RMV developed at both 14,000 dwellings and at 21,000 dwellings. The emission increases in comparison to the corresponding No Action Alternative were about the same with the RMV developed at the higher development rate of 21,000 dwellings. This does not mean that the regional emissions would be less with Rancho Mission Viejo at 21,000 dwellings than at 14,000 dwellings. The traffic forecasts show that the relative amount of traffic moving from the arterial roadways to the corridor/freeway network is less with the higher development than with the lower level of development.

Table 5-10 presents the result of analyses further examining interim years and the toll versus toll free conditions for the A7C-FECV. Similar results would occur with the other Alignment 7 Corridor Alternatives. For the A7C-FECV, changes in emissions in comparison to the corresponding No Action Alternative are presented for the years 2008 (opening year), 2018, and 2025. The emissions for each of these cases are similar. NOx emissions increase in comparison to the No Action Alternatives and the increases substantially exceed SCAQMD thresholds for all years. Emissions of HC and CO are substantially less for all years than the No Action Alternatives. PM10 emissions are about the same with or without the project. As discussed previously, the NOx emissions are higher and HC and CO emissions are lower because with the corridor more vehicles will be traveling at high speeds.

TABLE 5-10
Alignment A7 - Regional Traffic Emission Changes For Intermediate Years And For Toll-Free Conditions
(Values in Bold Represent Significant Increases in Emissions)

		Alignment 7 Corridor Far East Crossover Variation (A7C-FECV)			
		Year 2008; Committed Network (29a)	Year 2018; Committed Network (29b)	Year 2025 MPAH/RTP; RMV @ 21,000 DU (29)	Year 2025; Toll Free MPAH/RTP; RMV @ 21,000 DU (43)*
HC	kg./day	2	-34	-25	-56
	lbs./day	4	-76	-56	-123
CO	kg./day	-118	-432	-836	-1,365
	lbs./day	-261	-952	-1,843	-3,010
NOx	kg./day	**194**	**153**	**62**	**160**
	lbs./day	**429**	**337**	**138**	**353**
PM10	kg./day	-1	-6	3	-13
	lbs./day	-1	-14	8	-29

*Toll-Free Analysis is for Alignment 7 Corridor Complete (A7C)

The last two columns provide a comparison between toll and toll-free conditions. The emissions are higher for NOx with the toll-free condition, and lower for the other pollutants with the toll-free condition. With the toll-free conditions more vehicles are traveling at high speeds and this results in increased NOx emissions and lower HC and CO emissions. The regional increase in NOx emissions for both the toll and toll-free conditions are above the SCAQMD thresholds of significance.

In summary, the regional traffic emissions will decrease substantially in future years. The reduction in emissions will not be due to the proposed project, but will occur with or without the project. The decrease will be due to the use of cleaner vehicles in future years which is mandated by state and federal laws.

In comparison to the No Action Alternatives, the Alignment 7 Alternatives will result in substantial increases in NOx emissions. Emissions of HC and CO go down with the operation of all of the Alignment 7 Alternatives. PM10 emissions are essentially unchanged. The Alignment 7 Alternatives result in more vehicles traveling on the corridors at a higher speed than with the corresponding No Action Alternatives. More travel at higher speeds is primarily responsible for the increase in NOx emissions and the decreases in HC and CO emissions. The emissions are about the same for all of the Alignment 7 Alternatives.

5.1.5 ARTERIAL IMPROVEMENT ALTERNATIVES

The changes in subregional and regional emissions due to the two Arterial Improvement Alternatives are presented in Table 5-11. The change in emissions presented in the table represent the difference in emissions that would result with the alternative in comparison to the corresponding No Action Alternative. Alternatives presented include the Arterial Improvements Only Alternative (AIO) and the Arterial Improvements Plus HOV and Spot Mixed-Flow Lanes on I-5 Alternative (AIP). For each alternative, emissions changes are presented based on varying land use and roadway network assumptions. All alternatives were evaluated assuming that RMV would be developed with both 14,000 and 21,000 dwelling units. All alternatives were evaluated assuming an enhanced roadway network per the MPAH and the RTP. It should be emphasized that the values presented in the following tables represent the change in emissions in comparison to the corresponding No Action scenario. Therefore, the first column of values represents the change in emissions between the AIO (with the enhanced MPAH roadway network and RMV at 14,000 dwellings) and the No Action Alternative (with the enhanced MPAH roadway network and RMV at 14,000 dwellings). A negative number indicates that the emissions would be less with the AIO or AIP Alternative. Values that are bolded indicate that an increase greater than the SCAQMD significance thresholds would occur with the proposed alternative. The following tables in this section represent both regional and subregional emission changes. To clarify further, the analyses examine the change in roadway network emissions. The roadway network does not extend through the entire SCAB and SDAB, but rather only a portion or subregion of those basins. Therefore, these changes in emissions can be characterized as subregional emissions because they are based on a subregion of the air basins. However, the traffic network extends out far enough so that changes in traffic patterns are miniscule outside of the traffic network, and therefore, the subregional changes in emissions also represent the change in regional emissions. Since "regional" emissions is the more common term, we have used this term instead of the more cumbersome phase of "subregional and regional" emissions throughout this subsection.

TABLE 5-11
Arterial Improvement Alternatives - Regional Traffic Emission Changes In Comparison To The Corresponding No Action Alternatives
(Values in Bold Represent Significant Increases in Emissions)

		Arterial Improvements Only (AIO)		Arterial Improvements Plus I-5 Widening (AIP)	
		Year 2025; Enhanced MPAH/RTP; RMV @ 14,000 DU (32)	Year 2025; Enhanced MPAH/RTP; RMV @ 21,000 DU (33)	Year 2025; Enhanced MPAH/RTP; RMV @ 14,000 DU (34)	Year 2025; Enhanced MPAH/RTP; RMV @ 21,000 DU (35)
HC	kg./day	-2	-2	-2	-2
	lbs./day	-4	-5	-3	-4
CO	kg./day	-103	-174	-204	-276
	lbs./day	-227	-383	-451	-609
NOx	kg./day	21	**37**	**46**	**63**
	lbs./day	47	**81**	**102**	**139**
PM10	kg./day	2	3	3	5
	lbs./day	4	7	7	10

The AIP Alternative will exceed the SCAQMD thresholds for NOx. The AIO Alternative will cause significant increases in NOx emissions with RMV at 21,000, but not with 14,000 dus. Increases in PM10 emissions are not substantial and are below the SCAQMD thresholds for both alternatives. HC emissions are projected to decrease slightly, and CO emissions are projected to decrease substantially.

It is important to understand why the NOx emissions increase for the AIP Alternative. The increase in emissions for the AIP Alternative is primarily due to higher off-peak speeds on I-5. The AIP Alternative includes the widening of the I-5. During off-peak hours, the speeds on I-5 will be higher with the AIP Alternative than without. This increase in off-peak speeds accounts for the higher emissions of NOx for this alternative.

Both alternatives were assessed with RMV developed at both 14,000 dwellings and at 21,000 dwellings. The emission increases in comparison to the corresponding No Action Alternative were higher for the higher level of RMV development.

The change in emissions over time is important to insure that worst case is assessed. Table 5-12 presents the emissions for the AIO in comparison to the existing emissions.

(Similar results will occur with the AIP.) The opening day (i.e., year 2008), 2018, and 2025 conditions are assessed. The last two columns present a sensitivity check by looking at different assumptions for the development of RMV.

TABLE 5-12
Traffic Emission Changes In Comparison to Existing Emissions
(Values in Bold Represent Significant Increases in Emissions)

		Arterial Improvements Only (AIO) Versus Existing			
		Year 2008; Enhanced MPAH/RTP; (33a)	Year 2018; Enhanced MPAH/RTP; (33b)	Year 2025; Enhanced MPAH/RTP; RMV @ 21,000 DU (33)	Year 2025; Enhanced MPAH/RTP; RMV @ 14,000 DU (32)
HC	kg./day	-40,801	-67,107	-73,831	-73,877
	lbs./day	-89,952	-147,946	-162,769	-162,871
CO	kg./day	-634,362	-1,153,156	-1,326,381	-1,326,879
	lbs./day	-1,398,531	-2,542,276	-2,924,173	-2,925,269
NOx	kg./day	-189,998	-367,355	-418,153	-418,164
	lbs./day	-418,873	-809,879	-921,871	-921,896
PM10	kg./day	**1,401**	**2,697**	**4,378**	**4,362**
	lbs./day	**3,089**	**5,947**	**9,653**	**9,616**

Note: Existing emissions are presented in Table 3-8.

The amount of HC, CO, and NOx emissions decreases dramatically in future years. HC emissions will be about 40,800 kilograms per day (89,952 lbs. per day) less in 2008 than with existing conditions. By 2025, the reduction in emissions over current conditions will be about 73,800 kilograms per day (about 163,000 lbs. per day) of HC. Reductions in CO by 2025 will be over 1.3 million kilograms per day (2.9 million pounds per day), and NOx will have been reduced by roughly 418,000 kilograms per day (920,000 lbs. per day). These huge decreases in regional traffic emissions will occur because the emission rates will be lower in future years. The use of cleaner cars, which is mandated by state and federal laws, will continue to reduce the emission rates from motor vehicles dramatically. In fact, it should be noted that the traffic forecast shows that the VMT in the study area will increase by more than 35% between existing conditions and year 2025. However, the use of cleaner vehicles will more than offset this increase in traffic and result in the huge decreases in regional emissions shown above.

PM10 emission rates are not projected to decrease substantially in future years, and therefore, the increase in subregional traffic causes subregional emissions to increase in future years. The increases in PM10 emissions over existing conditions will be higher than SCAQMD threshold of significance for PM10.

Table 5-13 presents the result of analyses further examining interim years for the AIO Alternative. Similar results would occur with the AIP Alternative. For the AIO Alternative changes in emissions in comparison to the corresponding No Action Alternative are presented for the years 2008 (opening year), 2018, and 2025. NOx emissions exceed SCAQMD thresholds for year 2025. The AIO Alternative causes only small increases in speed (higher emissions) that are offset by small reductions in VMT (lower emissions). HC and CO emissions decrease in comparison to the No Action Alternative. PM10 remains about the same as the No Action Alternative.

TABLE 5-13
Arterial Improvement Only Alternative - Regional Traffic Emission Changes For Intermediate Years
(Values in Bold Represent Significant Increases in Emissions)

		Arterial Improvements Only (AIO)		
		Year 2008; Enhanced MPAH/RTP; (33a)	Year 2018; Enhanced MPAH/RTP; (33b)	Year 2025; Enhanced MPAH/RTP; RMV @ 21,000 DU (33)
HC	kg./day	-16	-32	-2
	lbs./day	-36	-70	-5
CO	kg./day	-219	-362	-174
	lbs./day	-483	-799	-383
NOx	kg./day	-30	-4	**37**
	lbs./day	-67	-9	**81**
PM10	kg./day	-3	-7	3
	lbs./day	-7	-15	7

In summary, the regional traffic emissions for both AIO and AIP Alternatives will decrease substantially in future years. The reduction in emissions will not be due to the proposed project, but will occur with or without the project. The decrease will be due to the use of cleaner vehicles in future years which is mandated by state and federal laws. In comparison to the No Action Alternatives, the AIP will result in substantial increases in NOx emissions and will result in a regional impact. The AIO Alternative will result in substantial increases in NOx with RMV developed at 21,000 dus.

5.1.6 I-5 WIDENING ALTERNATIVE

The changes in subregional and regional emissions due to the I-5 Widening Alternative are presented in Table 5-14. The change in emissions in the table represents the difference in emissions that would result with this alternative in comparison to the corresponding No Action Alternative. Emission changes are presented based on varying land use and roadway network assumptions. The I-5 Alternative was evaluated assuming that RMV would be developed with 14,000 and 21,000 dwelling units. The I-5 Alternative was evaluated assuming a committed roadway network and a built out roadway network per the MPAH and the RTP. It should be emphasized that the values presented in the following table represent the change in emissions in comparison to the corresponding No Action Alternative. Therefore, the first column of values represents the change in emissions between the I-5 Alternative (with the committed roadway network and RMV at 14,000 dwellings) and the No Action Alternative (with the committed roadway network and RMV at 14,000 dwellings). Values that are bolded indicate that an increase greater than the SCAQMD significance thresholds would occur with the proposed alternative. The following tables in this section represent both regional and subregional emission changes. To clarify further, the analyses examine the change in roadway network emissions. The roadway network does not extend through the entire SCAB and SDAB, but rather only a portion or subregion of those basins. Therefore, these changes in emissions can be characterized as subregional emissions because they are based on a subregion of the air basins. However, the traffic network extends out far enough so that changes in traffic patterns are miniscule outside of the traffic network, and therefore, the subregional changes in emissions also represent the change in regional emissions. Since "regional" emissions is the more common term, we have used this term instead of the more cumbersome phase of "subregional and regional" emissions throughout this subsection.

TABLE 5-14
I-5 Widening Alternative - Regional Traffic Emission Changes In Comparison To The Corresponding No Action Alternatives
(Values in Bold Represent Significant Increases in Emissions)

		I-5 Widening Alternative		
		Year 2025; Committed; RMV @ 14,000 DU (36)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (37)	Year 2025; MPAH/RTP; RMV @ 21,000 DU (38)
HC	kg./day	-4	-4	-6
	lbs./day	-9	-9	-12
CO	kg./day	-712	-479	-580
	lbs./day	-1569	-1057	-1279
NOx	kg./day	**140**	**96**	**104**
	lbs./day	**308**	**211**	**230**
PM10	kg./day	7	4	5
	lbs./day	14	8	11

The I-5 Alternative will exceed the SCAQMD thresholds for NOx for all scenarios. CO emissions decrease substantially for all scenarios. HC and PM10 emissions are essentially unchanged in comparison to the No Action Alternative.

It is important to understand why the emissions increase, especially the emissions of NOx. There are three basic reasons for the increase. The first is simply that the vehicles miles traveled (VMT) for the region increase with the widening of I-5. People are willing to travel further to get to the I-5 where they can travel at higher speeds and get to their final destinations quicker. This is confirmed by the fact that although the VMT increases for the region with the I-5 widening, the vehicle hours traveled (VHT) are lower. Therefore, with the wider freeway, people will travel further to get to their destinations, but it will take less time to reach their destinations. More miles traveled results in higher emissions.

The second reason for increased NOx emissions is tied into travel speeds. The off-peak travel speeds for I-5 are anticipated to increase for the freeway with the widening. The increase in speeds results in an increase in NOx emissions.

Third, some vehicles are projected to move off of the arterial roadways and to travel on I-5. The vehicles will be traveling at higher speeds on I-5 than on the arterial roadways, and this also results in higher NOx emissions.

For the I-5 Alternative, both a committed roadway network and a buildout (MPAH/RTP) roadway network were considered. Increases of regional NOx emissions were less with the buildout network than with the committed network.

The I-5 Alternative was assessed with RMV developed at both 14,000 dwellings and at 21,000 dwellings. The emission increases in comparison to the corresponding No Action Alternative were nearly the same for both development scenarios.

The change in regional emissions over time is important. Table 5-15 presents the emissions for the I-5 Widening in comparison to the existing emissions. The opening day (i.e., year 2008), 2018, and 2025 conditions are assessed.

TABLE 5-15
Traffic Emission Changes In Comparison to Existing Emissions
(Values in Bold Represent Significant Increases in Emissions)

		I-5 Widening Alternative Versus Existing		
		Year 2008; Committed Network (38a)	Year 2018; Committed Network (38b)	Year 2025; MPAH/RTP; RMV @ 21,000 DU (38)
HC	kg./day	-40,761	-67,081	-73,834
	lbs./day	-89,864	-147,888	-162,776
CO	kg./day	-634,074	-1,152,903	-1,326,788
	lbs./day	-1,397,894	-2,541,719	-2,925,069
NOx	kg./day	-189,507	-367,080	-418,085
	lbs./day	-417,793	-809,273	-921,721
PM10	kg./day	**1,406**	**2,704**	**4,380**
	lbs./day	**3,099**	**5,961**	**9,656**

Note: Existing emissions are presented in Table 3-8.

The amount of HC, CO, and NOx emissions decrease dramatically in future years. HC emissions will be almost 40,761 kilograms per day (89,864 lbs. per day) less in 2008 than with existing conditions. By 2025, the reduction in emissions over current conditions will be almost 74,000 kilograms per day ((162,000 lbs. per day) of HC. Reductions in CO by the year 2025 will be over 1.3 million kilograms per day (2.9 lbs. per day), and

NOx will have been reduced by roughly 418,000 kilograms per day (922,000 lbs. per day). These huge decreases in regional traffic emissions will occur because the emission rates will be lower in future years. The use of cleaner cars, which is mandated by state and federal laws, will continue to reduce the emission rates from motor vehicles dramatically. In fact, it should be noted that the traffic forecast shows that the VMT in the study area will increase by more than 35% between existing conditions and year 2025. However, the use of cleaner vehicles will more than offset this increase in traffic and result in the huge decreases in regional emissions shown in Table 5-15.

PM10 emission rates are not projected to decrease in future years as rapidly as the other pollutants, and therefore, the regional emissions are projected to increase in future years. The increases in PM10 emissions over existing conditions will be higher than SCAQMD threshold of significance for PM10.

Table 5-16 presents the result of analyses further examining interim years for the I-5 Alternative. For the I-5 Alternative, changes in emissions in comparison to the corresponding No Action Alternative are presented for the years 2008 (opening year), 2018, and 2025. The emissions for each of these cases are similar. NOx emissions substantially exceed SCAQMD thresholds for all years. As discussed previously the emissions are higher because with the widened freeway, the vehicle miles traveled will increase and more vehicles will be traveling on I-5 at higher speeds.

TABLE 5-16
I-5 Alternative - Regional Traffic Emission Changes For Intermediate Years
(Values in Bold Represent Significant Increases in Emissions)

		I-5 Widening Alternative		
		Year 2008; Committed Network (38a)	Year 2018; Committed Network (38b)	Year 2025; MPAH/RTP; RMV @ 21,000 DU (38)
HC	kg./day	24	-5	-6
	lbs./day	52	-11	-12
CO	kg./day	70	-110	-580
	lbs./day	154	-241	-1279
NOx	kg./day	**460**	**271**	**104**
	lbs./day	**1014**	**597**	**230**
PM10	kg./day	1	0	5
	lbs./day	3	-1	11

In summary, the regional traffic emissions will decrease substantially in future years. The reduction in emissions will not be due to the proposed project, but will occur with or without the project. The decrease will be due to the use of cleaner vehicles in future years which is mandated by state and federal laws. In comparison to the No Action Alternatives, the I-5 Alternative will result in substantial increases in NOx emissions and will result in an adverse regional impact. The I-5 Alternative results in higher regional emissions because the vehicle miles traveled will increase with the I-5 widening, and off-peak speeds on I-5 will increase, which will result in higher emissions.

5.1.7 NO ACTION ALTERNATIVES

The changes in subregional and regional emissions due to the various alternatives have been contrasted to the No Action Alternatives in the preceding sections. The change in emissions for the various No Action Alternatives in comparison to existing conditions are presented in Table 5-17. The change in emissions presented here represent the difference in emissions that would result with the No Action Alternatives in comparison to existing conditions. No Action Alternatives emissions changes are presented based on varying land use and roadway network assumptions. The No Action Alternatives were evaluated assuming that RMV would be developed with 14,000 dwelling units, and were evaluated assuming a committed roadway network and a built out roadway network per the MPAH and the RTP. It should be emphasized that the values presented in the following tables represent the change in emissions in comparison to existing conditions (year 2001). A negative number indicates that the emissions would be less than existing conditions. Values that are bolded indicate that an increase greater than the SCAQMD significance thresholds would occur with the specific No Action Alternative. The following tables in this section represent both regional and subregional emission changes. To clarify further, the analyses examine the change in roadway network emissions. The roadway network does not extend through the entire SCAB and SDAB, but rather only a portion or subregion of those basins. Therefore, these changes in emissions can be characterized as subregional emissions because they are based on a subregion of the air basins. However, the traffic network extends out far enough so that changes in traffic patterns are miniscule outside of the traffic network, and therefore, the subregional changes in emissions also represent the change in regional emissions. Since “regional” emissions is the more common term, we have used this term instead of the more cumbersome phase of “subregional and regional” emissions throughout this subsection.

TABLE 5-17
No Action Alternatives In Comparison to Existing Emissions For Various Land Use and Traffic Network Assumptions
(Values in Bold Represent Significant Increases in Emissions)

		No Action Alternatives (NA)		
		Year 2025; Committed; RMV @ 14,000 DU (2)	Year 2025; MPAH/RTP; RMV @ 14,000 DU (3)	Year 2025 MPAH/RTP; RMV @ 21,000 DU (5)
HC	kg./day	-73,869	-73,875	-73,828
	lbs./day	-162,853	-162,867	-162,763
CO	kg./day	-1,326,408	-1,326,776	-1,326,208
	lbs./day	-2,924,232	-2,925,042	-2,923,790
NOx	kg./day	-418,239	-418,186	-418,190
	lbs./day	-922,060	-921,943	-921,952
PM10	kg./day	**4,358**	**4,360**	**4,375**
	lbs./day	**9,608**	**9,612**	**9,645**

The emissions will decrease substantially for the year 2025 in comparison to existing conditions for all pollutants except PM10. Emission rates for HC, CO, and NOx are anticipated to decrease substantially and will more than offset the growth anticipated in the area. The emissions forecasted for all the No Action Alternatives are all very similar. The No Action Alternative with the buildout of the roadway network and RMV at 21,000 has the highest forecast level of emissions for PM10.

The change in emissions over time is important. Table 5-18 presents the emissions for the No Action Alternative in comparison to existing emissions. The opening day (i.e., year 2008), 2018, and 2025 conditions are assessed.

TABLE 5-18
No Action Alternatives In Comparison to Existing Emissions For Various Years
(Values in Bold Represent Significant Increases in Emissions)

		No Action Alternatives (NA)		
		Year 2008 (5a)	Year 2018 (5b)	Year 2025 MPAH/RTP; RMV @ 21,000 DU (5)
HC	kg./day	-40,785	-67,076	-73,828
	lbs./day	-89,916	-147,877	-162,763
CO	kg./day	-634,143	-1,152,794	-1,326,208
	lbs./day	-1,398,048	-2,541,477	-2,923,790
NOx	kg./day	-189,967	-367,350	-418,190
	lbs./day	-418,806	-809,870	-921,952
PM10	kg./day	**1,404**	**2,704**	**4,375**
	lbs./day	**3,096**	**5,962**	**9,645**

The amount of HC, CO, and NOx emissions decrease dramatically in future years. HC emissions will be over 40,700 kilograms per day (89,900 lbs. per day) less in the year 2008 than with existing conditions. By 2025, the reduction in emissions over current conditions will be nearly 74,000 kilograms per day (163,000 lbs. per day) of HC. Reductions in CO by 2025 will be over 1.3 million kilograms per day (2.9 million lbs. per day), and NOx will have been reduced by roughly 418,000 kilograms per day (922,000 lbs per day). These huge decreases in regional traffic emissions will occur because the emission rates will be lower in future years. The use of cleaner cars, which is mandated by state and federal laws, will continue to reduce the emission rates from motor vehicles dramatically. In fact, it should be noted that the traffic forecast shows that the VMT in the study area will increase by more than 35% between existing conditions and 2025. However, the use of cleaner vehicles will more than offset this increase in traffic and result in the huge decreases in regional emissions shown above.

PM10 emission rates are not projected to decrease in future years as rapidly as the other pollutants, and therefore, the regional emissions are not anticipated to decrease in future years. In fact, the PM10 emission levels will actually be higher than for existing conditions. The increases in PM10 emissions over existing conditions will be higher than SCAQMD threshold of significance for PM10.

5.1.8 SUMMARY OF REGIONAL AND SUBREGIONAL IMPACTS

The changes in subregional traffic emissions with the various alternatives are presented in Figures 5-2 and 5-3. All alternatives are represented and the emission increase over No Action Alternative is for 2025 with the committed roadway network and with Rancho Mission Viejo (RMV) at 14,000 dwelling units. Four charts are presented, one each for hydrocarbons (HC), carbon monoxide (CO), nitrogen oxides (NOx), and respirable particulate (PM10).

The first chart shows changes in comparison to the corresponding No Action Alternative for HC. HC emissions decrease for all alternatives. Some alternatives show larger decreases than other alternatives. The alternatives that show the largest decreases in HC emissions are FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, CC, A7C, A7C-FECV (including the A7C-FEC-M), and A7-FECV-C, and all of the listed alternatives had a decrease of at least 25 kg. per day (55 lbs. per day). In general, these alternatives showed the greatest increases in speed for the travel network, and higher speeds result in lower HC emissions. The seven alternatives listed would have substantial benefit on HC emissions for the region.

The second chart shows the changes in emissions for CO. All the alternatives show a decrease in CO emissions in comparison to the No Action Alternative. Some alternatives show greater decreases in CO emissions than others. Those with decreases greater than 550 pounds per day include FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, FEC-APV, CC, CC-ALPV, A7C, A7C-FECV (including the A7C-FEC-M), and A7-FECV-C. These nine alternatives would have a substantial benefit on CO levels for the region. Emission rates decrease with increasing speed, and these alternatives generally reflect those alternatives where the greatest increases in speed occur.

NOx emissions are presented in Figure 5-3. All alternatives show an increase in NOx emissions, except for two alternatives which show a slight decrease in emissions. Several alternatives have increases in emissions above 25 kilograms per day (55 pounds per day), and these increases should be considered as adverse impact. Alternatives which have increases greater than 25 kilograms per day (55 pounds per day) include FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, FEC-APV, CC, A7C, A7C-FECV (including the A7C-FEC-M), A7-FECV-C, AIP, and the I-5. No alternatives have decreases greater than 25 kilograms per day (55 lbs. per day). NOx emissions are highest for very slow speeds (less than 25 mph or 42 kph) and for high speeds (55 mph or 92 kph, and higher). The increases in emissions generally reflect more vehicles traveling at higher speeds.

The PM10 emission changes are also presented in Figure 5-3. Most of the alternatives show a slight increase in PM10 emissions, and some show a slight decrease in emissions. None of the increases or decreases is greater than 68 kilograms per day (150 pounds per day), and so none of the changes should be considered substantial.

The above paragraphs compare the emissions from the project alternatives with the SCAQMD significance thresholds. These thresholds are not necessarily an appropriate reference to determine the significance of project emissions for a project that effects emission releases over a very wide area. The SCAQMD thresholds are taken from the "1993 CEQA Air Quality Handbook," which states that the criteria "are consistent with the federal Clean Air Act definition of a significant source in an area classified as extreme for ozone." While it is correct that the thresholds are consistent as such, the SCAQMD ignores the fact that such criteria were developed initially by the U.S. EPA to be applied to point source emissions, such as an industrial smokestack. Comparisons between emissions from an extreme point source and emissions from the proposed project alternatives are clearly inappropriate in this context. Emissions from the project alternatives are from motor vehicles traveling primarily throughout south Orange County. Emissions from the proposed project bear no resemblance to emissions from industrial sources where the emissions are coming being released from a concentrated point source with measurable pollutant concentrations downwind from the industrial smokestack. The SCAQMD recommends that these thresholds be used by lead agencies in making a determination of significance. However, the final determination of whether or not a project is significant is within the purview of the lead agency pursuant to Section 15064 (b) of the CEQA Guidelines.

These charts focus on the change in subregional emissions associated with the SOCTIIP Alternatives. To determine the total emissions for the region or air basin, the subregional emission changes must be combined with regional emission inventories. The only comprehensive regional emission inventories are those contained in the AQMP. A Draft 2003 AQMP has been released and has been officially adopted by the SCAQMD and approved by CARB. It has not received approval by the U.S. EPA. The forecast data contained in the Draft 2003 AQMP uses the EMFAC2002 emission factors, and therefore, is consistent with the emission factors used in this analysis. The most distant year forecast contained in the Draft 2003 AQMP is for the year 2020. The project alternatives forecast data was linearly interpolated for 2020 based on the emissions forecasts presented previously for years 2018 and 2025. The project alternative data was then combined with the AQMP data to determine the total regional emissions for the primary project alternatives as shown in Table 5-19. It should be noted that the alignment most similar to the Far East Corridor Complete (FEC) is assumed in the Draft 2003 AQMP regional modeling. Therefore, the FEC is used as the base case in the regional emissions presented in Table 5-19.

TABLE 5-19
Total Regional Emissions for Various Alternatives (Year 2020)

	AQMP With Far East Corridor Complete	AQMP With Central Complete	AQMP With A7C-FECV	AQMP With Arterial Improve-ment Only	AQMP With I-5 Widening	AQMP With No Action
Kilograms Per Day						
HC	493,508	493,518	493,523	493,532	493,550	493,555
CO	1,845,214	1,845,327	1,845,379	1,845,618	1,845,682	1,845,926
NOx	457,221	457,228	457,242	457,122	457,338	457,115
PM10	285,763	285,765	285,767	285,766	285,772	285,770
Pounds Per Day						
HC	1,088,000	1,088,022	1,088,033	1,088,052	1,088,092	1,088,103
CO	4,068,000	4,068,249	4,068,364	4,068,890	4,069,032	4,069,570
NOx	1,008,000	1,008,015	1,008,046	1,007,783	1,008,258	1,007,766
PM10	630,000	630,003	630,008	630,007	630,018	630,016
Percent Change Compared to Total Regional Emissions						
HC	--	0.0020%	0.0030%	0.0047%	0.0084%	0.0095%
CO	--	0.0061%	0.0089%	0.0219%	0.0254%	0.0386%
NOx	--	0.0015%	0.0046%	-0.0216%	0.0256%	-0.0232%
PM10	--	0.0005%	0.0013%	0.0011%	0.0029%	0.0025%

The percent changes in regional emissions for the various alternatives in comparison to the Draft 2003 AQMP regional forecasts are all extremely small. The largest percentage increase is for the No Action Alternative for CO emissions, which is slightly over 3/100 of 1 percent. The AIO and the No Action Alternatives have slightly less NOx emissions than the FEC Alternatives, and the emissions show a slight percentage reduction as indicated by the negative percent change. Because these percentages are so low, from a regional perspective, the change in pollutant concentrations associated with the SOCTIIP Alternatives throughout the South Coast Air Basin (SCAB) would not be measurable.

The percentage changes are another indicator of the potential regional impact in addition to the SCAQMD significance thresholds. If a change in emissions results in a change that is measurable by regional pollutant monitoring equipment, then it might be at the threshold of causing an impact. Most air monitoring equipment has a sensitivity of less than 0.1% (1/10 of 1 percent). Changes less than 0.1% are not measurable and would not have any noticeable effect on health. It therefore seems reasonable, that if the regional emissions are not projected to increase by more than 0.1%, then there would be no measurable effect and no adverse impact on air quality levels. Applying this criterion, none of the alternatives result in an adverse regional air impact, because none of the alternatives increases emissions by more than 0.1%.

5.2 LOCAL AIR QUALITY ANALYSIS FOR PM10

The following analysis presents the assessment of PM10 concentrations near intersections and along the corridor. As addressed in Section 4.2.7 a qualitative analysis of PM10 hot spots is presented per FHWA guideline documents. The following section presents an alternate approach where PM10 concentrations are determined in a quantitative manner. The quantitative forecasting of PM10 concentrations is controversial, and the reader should be aware that, whereas considerable research has been conducted in developing modeling approaches for CO, more research needs to be conducted before PM10 concentrations can be forecasted with the same level of certainty.

5.2.1 METHODOLOGY

The local air quality impacts can be assessed by comparing future PM10 levels with state and federal AAQS presented previously in Section 3.7. The methodology used for the this local PM10 assessment is identical to that detailed in Section 4.2.1 for CO with the exceptions listed in this subsection.

The CALINE4 model projects 1-hour concentrations. To obtain 24-hour concentrations, a persistence factor is used. The method essentially uses a persistence factor that is multiplied times the 1-hour emission projections. The ambient concentration is then added to this product. For 24-hour PM10, a persistence factor of 0.6 was used based on the suggested methodology in the "Workbook of Atmospheric Dispersion Estimates" (EPA, 1970). (The computer printouts of the CALINE4 modeling are available for review at the TCA office.)

The monitoring data for PM10 concentrations in the last few years have not shown a decrease in PM10 emissions. Therefore, the future background PM10 concentrations are assumed to be the same as existing. Therefore, 98 $\mu g/m^3$ was determined to be the appropriate background levels for the 24 hour PM10 projections. It should be noted that this level exceeds the state AAQS of 50 $\mu g/m^3$ already, and is less than the federal AAQS of 150 $\mu g/m^3$.

The future peak hour traffic and volume/capacity (V/C) ratio data are from the Traffic and Circulation Technical Report prepared by Austin Foust and Associates. The PM peak hour traffic data is used for the CALINE4 computer modeling as the worst case alternative, because the PM peak hour traffic volumes are higher than the AM peak hour volumes. The V/C ratio is also known as the LOS at an intersection. The LOS determines the congestion levels at the intersections, and therefore, is important in the CALINE4 modeling. The LOS determines the average speed used at an intersection.

PM10 emission rates are relatively unaffected by speed. The PM10 concentrations are affected most by the number of vehicles passing through the intersection.

The air quality impacts will be assessed for six primary buildout (2025) alternatives. The six primary 2025 alternatives are: No Action, Far East Corridor-Complete (FEC), Central Corridor-Complete (CC), Alignment 7 Corridor-Complete (A7C), Arterial Improvements Only (AIO), and I-5 Widening (I-5). Year 2025 represents the worst case year. The emission rates for PM10 change very little between existing and 2025, whereas the level of traffic increases dramatically over this period of time. The background concentration of PM10 will remain essentially the same as today. Therefore, the worst case year for PM10 concentrations will be 2025.

5.2.2 FAR EAST CORRIDOR ALTERNATIVES

The analysis presented in this subsection focuses on the Far East Corridor-Complete (FEC) alternative in the initial configuration. The traffic forecasts are the same for both the initial and ultimate configurations. Only difference between the modeling for the initial and ultimate are for receptor directly adjacent to the tollway. The initial configuration has a slightly narrower cross-section, and because the pollutant are initially released into a smaller area, have a slightly higher concentration. That is, the initial configuration represents a worst case scenario for this analysis. The results presented should also be considered representative for all the Far East Corridor alternatives including the Far East Corridor Talega Variation (FEC-TV), the Far East Corridor Cristianitos Variation (FEC-CV), the Far East Corridor Highway Variation (FEC-OHV), the Far East Corridor-West (FEC-W), Far East Corridor-Modified (FEC-M), the Alignment 7 Corridor-Far East Crossover-Modified (A7C-FEC-M) and the Far East Corridor Avenida Pico Variation (FEC-APV) alternatives because the results of the traffic effects are similar.

The results of the PM10 modeling for the FEC-Initial alternative are summarized in Table 5-20 for 24 hour concentrations for PM10. The pollutant levels are expressed in $\mu g/m^3$ for PM10. The PM10 levels are the composites of the background levels of PM10, that is the emissions blowing into the area, plus those emissions generated by the local roadways. The receptor locations were shown previously in Figure 4-1.

Table 5-20
FAR EAST COMPLETE, PM10 PROJECTIONS - 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

Site	INTERSECTION	2025 PM10 EXISTING 24-hr	NO ACTION 24-hr	Scenario 8 FEC 24-hr
1	I-5/Alicia Parkway	111	110	109
2	Felipe/Oso Parkway	105	104	104
3	Antonio Pkwy./Oso Pkwy.	103	102	102
4	SR-241/Oso Parkway	100	100	98
5	Crown Valley/Marguerite	104	106	106
6	I-5/Ortega Highway	112	109	108
7	Antonio Pkwy./Ortega Hwy.	103	103	101
8	I-5/Vista Hermosa	106	106	105
9	Ave. Pico/La Pata	99	101	101
10	I-5/El Camino Real	109	110	108
11	I-5/Ave. Pico	106	109	108
12	Antonio Pkwy./Crown Valley	100	103	102
13	Vista Hermosa/La Pata	-	101	100
14	SR-241/Ave. Pico	-	-	101
	State Standards:	50 µg /m^3	50 µg/m^3	50 µg/m^3
	No. of Exceedance	12	13	14
	Federal Standards:	150 µg/m^3	150 µg/m^3	150 µg/m^3
	No. of Exceedance	0	0	0

The PM10 modeling results for the existing, 2025 No Action and 2025 FEC alternatives are presented in Table 4-20. The PM10 levels for all three conditions will comply with the federal PM10 AAQS of 150 µg/m^3. However, the future PM10 concentrations will exceed the State PM10 standard of 50 µg/m^3 for all three alternatives due to the high background concentrations which already exceed the state AAQS. That is, the background concentration, for both existing and future cases, alone exceeds the state PM10 AAQS. The PM10 concentration levels for all three alternatives will be very similar. As a result, the PM10 concentration levels are projected to consistently exceed the state AAQS in the future years. The concentrations with the FEC are the same or slightly lower than the No Action alternative. However, the differences are so small that the FEC will not result in a significant improvement over the No Action alternative.

5.2.3 CENTRAL CORRIDOR ALTERNATIVES

The analysis presented in this subsection focuses on the Central Corridor-Complete (CC) alternative in the initial configuration. However, the results presented should be considered representative for all the Central Corridor alternatives including the Central Corridor Avenida La Pata Variation (CC-ALPV) and the Central Corridor Ortega Highway Variation (CC-OHV) alternatives because the traffic effects are similar.

The results of the CALINE4 modeling for the Central Corridor (CC) alternatives are summarized in Table 4-21 for 24 hour concentrations of PM10. The pollutant levels are expressed in $\mu g/m^3$ for PM10. The PM10 levels are the composites of the background levels of PM10 coming into the area plus those generated by the local roadways. The receptor locations were shown previously in Figure 4-2.

Table 4-21
CENTRAL CORRIDOR, CO AND PM10 PROJECTIONS - 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

		2025 PM10		
	INTERSECTION	**EXISTING** 24-hr	**NO ACTION** 24-hr	**Scenario 20 CC** 24-hr
1	I-5/Alicia Parkway	111	110	109
2	Felipe/Oso Parkway	105	104	104
3	Antonio Pkwy./Oso Pkwy.	103	102	102
4	SR-241/Oso Parkway	100	100	98
5	Crown Valley/Marguerite	104	106	106
6	I-5/Ortega Highway	112	109	108
7	Antonio Pkwy./Ortega Hwy.	103	103	101
8	I-5/Vista Hermosa	106	106	105
9	Ave. Pico/La Pata	99	101	101
10	I-5/El Camino Real	109	110	110
11	I-5/Ave. Pico	106	109	107
12	Antonio Pkwy./Crown Valley	100	103	102
13	Vista Hermosa/La Pata	-	101	-
	State Standards:	50 μg/m^3	50 μg/m^3	50 μg/m^3
	No. of Exceedance	12	13	12
	Federal Standards:	150 μg/m^3	150 μg/m^3	150 μg/m^3
	No. of Exceedance	0	0	0

The PM10 modeling results for the existing, 2025 No Action and 2025 CC alternatives are presented in Table 5-21. The PM10 levels for all three cases will comply with the federal PM10 AAQS of 150 μg/m^3. However, the future PM10 concentrations will exceed the State PM10 AAQS of 50 μg/m^3 for all three alternatives due to the high background concentrations which already exceed the state AAQS. That is, the background concentration, for both existing and future cases, alone exceeds the state PM10 AAQS. The PM10 concentration levels for all three alternatives will be very similar. As a result, the PM10 concentration levels are projected to consistently exceed the state AAQS in the future years. The concentrations with the CC are the same or slightly lower than the No Action alternative. However, the differences are so small that the CC alternative will not result in a substantial improvement over the No Action alternative.

5.2.4 ALIGNMENT 7 CORRIDOR ALTERNATIVES

The analysis presented in this subsection focuses on the Alignment 7 Corridor (A7C) alternative in the initial configuration. However, the results presented should also be considered representative for all of the Alignment 7 Corridor alternatives because the projections of the traffic effects are similar.

The results of the PM10 modeling for the A7C alternatives are summarized in Table 5-22 for 24 hour concentrations for PM10. The pollutant levels are expressed in $\mu g/m^3$ for PM10. The PM10 levels are composites of the background levels of PM10 coming into the area plus those generated by the local roadways. The receptor locations were previously presented in Figure 4-3.

Table 5-22
ALTERNATIVE 7 (A7C), CO AND PM10 PROJECTIONS FOR 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

	INTERSECTION	PM10 EXISTING 24-hr	NO ACTION 24-hr	Scenario 29 A7C 24-hr
1	I-5/Alicia Parkway	111	110	109
2	Felipe/Oso Parkway	105	104	104
3	Antonio Pkwy./Oso Pkwy.	103	102	102
4	SR-241/Oso Parkway	100	100	98
5	Crown Valley/Marguerite	104	106	106
6	I-5/Ortega Highway	112	109	107
7	Antonio Pkwy./Ortega Hwy.	103	103	102
8	I-5/Vista Hermosa	106	106	105
9	Ave. Pico/La Pata	99	101	101
10	I-5/El Camino Real	109	110	107
11	I-5/Ave. Pico	106	109	107
12	Antonio Pkwy./Crown Valley	100	103	102
13	Vista Hermosa/La Pata	-	101	-
14	SR-241/Ave. Pico	-	-	101
	State Standards:	50 $\mu g/m^3$	50 $\mu g/m^3$	50 $\mu g/m^3$
	No. of Exceedance	12	13	13
	Federal Standards:	150 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
	No. of Exceedance	0	0	0

The PM10 modeling results for the existing, 2025 No Action and 2025 A7C alternatives are presented in Table 5-22. The PM10 levels for all three alternatives will comply with the federal PM10 AAQS of 150 $\mu g/m^3$. However, the future PM10 concentrations will exceed the state PM10 AAQS of 50 $\mu g/m^3$ for all three alternatives due to the high background concentrations which already exceed the state AAQS. That is, the background concentration alone exceeds the state PM10 AAQS. The PM10 concentration levels for all three alternatives will be very similar. As a result, the PM10 concentration levels are projected to consistently exceed the state AAQS in the future years. The concentrations with the A7C are the same or slightly lower than the No Action alternative. However, the differences are so small that the A7C will not result in a significant improvement over the No Action alternative.

5.2.5 ARTERIAL IMPROVEMENT ALTERNATIVES

The analysis presented in this subsection focuses on the Arterial Improvement Only (AIO) alternative. However, the results should also be considered representative for the Arterial Improvements plus I-5 Widening (AIP) alternative because the traffic effects are similar.

The results of the PM10 modeling for the AIO alternative are summarized in Table 5-23 for 24 hour concentrations for PM10. The pollutant levels are expressed in $\mu g/m^3$ for PM10. The PM10 levels are composites of the background levels of PM10 coming into the area plus those generated by the local roadways. The receptor locations were presented previously in Figure 4-4.

Table 5-23
ARTERIAL IMPROVEMENT ONLY, CO AND PM10 PROJECTIONS - 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

	INTERSECTION	**PM10** EXISTING 24-hr	NO ACTION 24-hr	Scenario 33 AIO 24-hr
1	I-5/Alicia Parkway	111	110	110
2	Felipe/Oso Parkway	105	104	104
3	Antonio Pkwy./Oso Pkwy.	103	102	105
4	SR-241/Oso Parkway	100	100	98
5	Crown Valley/Marguerite	104	106	106
6	I-5/Ortega Highway	112	109	108
7	Antonio Pkwy./Ortega Hwy.	103	103	103
8	I-5/Vista Hermosa	106	106	106
9	Ave. Pico/La Pata	99	101	102
10	I-5/El Camino Real	109	110	109
11	I-5/Ave. Pico	106	109	109
12	Antonio Pkwy./Crown Valley	100	103	103
13	Vista Hermosa/La Pata	-	101	-
14	SR-241/Ave. Pico	-	-	-
	State Standards:	50 $\mu g/m^3$	50 $\mu g/m^3$	50 $\mu g/m^3$
	No. of Exceedance	12	13	12
	Federal Standards:	150 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
	No. of Exceedance	0	0	0

The PM10 modeling results for the existing, 2025 No Action and 2025 AIO alternatives are presented in Table 5-23. The PM10 levels for all three cases will comply with the federal PM10 AAQS of 150 $\mu g/m^3$. However, the future PM10 concentrations will exceed the state PM10 AAQS of 50 $\mu g/m^3$ for all three cases due to the high background concentrations which already exceed the state AAQS. That is, the background concentration alone exceeds the state PM10 AAQS. The PM10 concentration levels for all three cases will be very similar. As a result, the PM10 concentration levels are projected to consistently exceed the state AAQS in the future years. The concentrations with the AIO alternatives are the same or slightly lower than the No Action alternative except for Site 3. However, the differences are so small that the AIO will not result in a substantial improvement or degradation compared to the No Action alternative.

5.2.6 I-5 WIDENING ALTERNATIVE

The analysis presented in this subsection focuses on the I-5 Widening (I-5) alternative. The results of the PM10 modeling for the I-5 alternative are summarized in Table 5-24 for 24 hour concentrations for PM10. The pollutant levels are expressed in µg/m3 for PM10. The PM10 levels are composites of the background levels of PM10 coming into the area plus those generated by the local roadways. The receptor locations were presented previously in Figure 4-4.

Table 5-24
I-5 WIDENING (I-5), CO AND PM10 PROJECTIONS - YEAR 2025
(MPAH NETWORK, OCP-2000 WITH BUILDOUT TOLL NETWORK @21,000 RMV DU)

		PM10		
	INTERSECTION	**EXISTING** 24-hr	**NO ACTION** 24-hr	**Scenario 38 I-5** 24-hr
1	I-5/Alicia Parkway	111	110	112
2	Felipe/Oso Parkway	105	104	105
3	Antonio Pkwy./Oso Pkwy.	103	102	102
4	SR-241/Oso Parkway	100	100	101
5	Crown Valley/Marguerite	104	106	106
6	I-5/Ortega Highway	112	109	110
7	Antonio Pkwy./Ortega Hwy.	103	103	102
8	I-5/Vista Hermosa	106	106	106
9	Ave. Pico/La Pata	99	101	101
10	I-5/El Camino Real	109	110	110
11	I-5/Ave. Pico	106	109	109
12	Antonio Pkwy./Crown Valley	100	103	103
13	Vista Hermosa/La Pata	-	101	-
14	SR-241/Ave. Pico	-	-	-
	State Standards:	50 µg/m^3	50 µg/m^3	50 µg/m^3
	No. of Exceedance	12	13	12
	Federal Standards:	150 µg/m^3	150 µg/m^3	150 µg/m^3
	No. of Exceedance	0	0	0

The PM10 modeling results for the existing, 2025 No Action and 2025 I-5 cases are presented in Table 5-24. The PM10 levels for all three cases will comply with the federal PM10 AAQS of 150 $\mu g/m^3$. However, the future PM10 concentrations will exceed the state PM10 AAQS of 50 $\mu g/m^3$ for all three cases due to the high background concentrations which already exceed the state AAQS. That is, the background concentration alone exceeds the state PM10 AAQS. The PM10 concentration levels for all three cases will be very similar. As a result, the PM10 concentration levels are projected to consistently exceed the state AAQS in the future years. The concentrations with the I-5 are the same or slightly higher for four sites than the No Action alternative, and lower for one site. The rest of the sites are the same for the I-5 alternative and the No Action alternative. However, the differences are so small that the I-5 will not result in a significant degradation or improvement over the No Action alternative.

5.2.7 SUMMARY OF LOCAL AIR IMPACTS FOR PM10

Future PM10 concentrations are projected to be in compliance with the Federal 24 hour PM10 AAQS for all build alternatives. However, the PM10 concentrations for all build alternatives are projected to exceed the state AAQS. This is because the background PM10 emissions are projected to be over the state AAQS with or without the project. The increases in PM10 levels due to the build alternatives are very small. Similarly, the differences between existing conditions and the No Action scenario are very small. No impacts on local PM10 levels will occur with any of the build alternatives.

5.3 DIESEL PARTICULATE MATTER TOXIC IMPACT

Although the FHWA guidance (Memo from James M. Shrouds, April 3, 2003) states that a toxic air contaminant assessment is not appropriate at this time for roadway projects, the TCA has conducted an assessment as part of the CEQA analysis. A toxic air contaminant study which focuses on diesel particulate matter was prepared and included as an appendix to this report. The information in this section is a summary of the "Air Quality Assessment – Appendix B, Diesel Particulates; South Orange County Transportation Infrastructure Improvement Project," (by Mestre Greve Associates, Report #03-241, November 17, 2003).

In 1998 the California Air Resources Board (ARB) identified particulate matter from diesel-fueled engines (Diesel Particulate Matter or DPM) as a Toxic Air Contaminant (TAC). As a part of the identification process, the ARB's Office of Environmental Health Hazard Assessment (OEHHA) evaluated the potential for DPM to affect human health. The OEHHA found that exposures to DPM resulted in an increased risk of cancer and an increase in chronic noncancer health effects including a greater incidence of cough, labored breathing, chest tightness, wheezing, and bronchitis. DPM is one of several airborne TACs. ARB and South Coast Air Quality Management District

(SCAQMD) studies show that DPM contributes approximately 71% of the potential inhalation cancer risk.

The purpose of this document is to provide a general examination of the potential DPM impacts from the development of the South Orange County Transportation Infrastructure Improvement Project (SOCTIIP). At this time, tools and methodologies for assessing DPM impacts are limited, and not all state and federal transportation agencies even agree that DPM impacts can be modeled in a meaningful way. The TCA as the Lead Agency under CEQA determined that general interim methodologies developed by the SCAQMD and the ARB were appropriate to use to develop an estimate of the DPM related impact of the SOCTIIP alternatives. (These methodologies are described in Section 1.2 of the full report.) This analysis is for information only as there is not yet wide agreement about the effects of DPM, or the methodology to analyze the effects.

This study examines potential DPM impacts in two areas, at the northern end of the proposed corridor build alternatives south of Antonio Boulevard, and along I-5 as it passes through San Clemente south of Avenida Pico. All the proposed corridor build alternatives have similar alignments at the north end. A generalized alignment was modeled under the initial configuration (i.e., a 4-lane highway) and ultimate configuration (i.e., an 8-lane highway). Concentrations and health risks are calculated for receptors along the roadway and at the nearest existing residential uses. Concentrations were modeled for receptors along the Corridor Build Alternatives for three scenarios, Initial Configuration, Initial Configuration widened to the Ultimate configuration in 2025 and Ultimate Configuration. Concentrations were modeled for receptors along I-5 for four scenarios; no project conditions, I-5 Widening alternative conditions, corridor build conditions where the corridor intersects I-5 near Avenida Pico, and corridor build conditions where the corridor intersects I-5 near the Orange County/San Diego County border.

5.3.1 BACKGROUND ON DIESEL PARTICULATES

During an exhaustive 10-year scientific process, the OEHHA found that exposures to DPM resulted in an increased risk of cancer and an increase in chronic noncancer health effects including a greater incidence of cough, labored breathing, chest tightness, wheezing, and bronchitis. The OEHHA estimated that based on available studies, the potential cancer risk from exposure to DPM of 1 microgram per cubic meter ($\mu g/m^3$) ranged from 130 to 2,400 excess cancers per million. The ARB's Scientific Review Panel (SRP) approved the OEHHA's determination concerning health effects and approved these values as the range of risk for DPM. This wide range demonstrates the uncertainty in the cancer risk from DPM. The SRP concluded that a value of 300 excess cancers per million people per $\mu g/m^3$ of DPM was appropriate as a point estimate of unit risk factor (URF) for DPM. There is not yet a scientific consensus concerning the appropriate URF for DPM. As of early 2002, the EPA decided that the literature did not support identifying a URF for DPM.

The OEHHA also concluded that exposure to DPM concentrations in excess of 5 $\mu g/m^3$ can result in a number of long-term (chronic) noncancer heath effects including greater incidence of cough, phlegm, and bronchitis. The 5 $\mu g/m^3$ value is referred to as the Chronic Reference Exposure Value (REL) for DPM. The SRP supported the OEHHA's conclusion and noted that the REL may need to be lowered further as more data emerge on potential adverse noncancer effects of DPM.

To provide a perspective on the contribution that DPM has on the overall statewide average ambient air toxics potential cancer risk, the ARB evaluated risks from specific compounds using data from ARB's ambient monitoring network. ARB maintains a 21 site air toxics monitoring network which measures outdoor ambient concentration levels for approximately 60 air toxics. The ARB has determined that, of the top ten inhalation risk contributors, DPM contributes 71% of the total potential cancer risk (the remaining 29% is split among butadiene, benzene, carbonyls and other pollutants).

The SCAQMD also conducted a study of air toxics in the SCAB, Multiple Air Toxics Exposure Study II (MATES-II), in 1998 and 1999. The MATES-II study estimated that the average basin wide potential cancer risk from DPM was about 1,000 excess cancers per million, or 71 percent of the average cancer risk from all air toxics in the SCAB. This is consistent with the ARB findings. Average ambient concentrations of air toxics are higher in the SCAB than elsewhere in the state, resulting in higher estimates of risk for residents in the SCAB. In general, the highest risks are in areas with high concentrations of mobile sources. Higher risk levels occur in the south-central Los Angeles area and in the Los Angeles/Long Beach harbor area. Risk levels in these areas are 3 to 4 times greater than in the majority of the SOCTIIP project area. The exception is along the northern section of the I-5 freeway, with in the project area, where risk levels are two times less than in some parts of Los Angeles.

To address the impacts of DPM, the ARB and EPA have enacted new diesel fueled vehicle emissions standards and diesel fuel rules that will go into effect in 2007. New emissions control measures will be required for new vehicles and reformulated diesel fuels are required to enable these measures. The emissions calculations in this report used EMFAC2002 to calculate emission factors. EMFAC2002 is a computer model published by the ARB that calculates vehicular emission factors. Emission factors calculated with EMFAC2002 include the effects of the new diesel fueled vehicle emissions standards.

5.3.2 METHODOLOGY

Specific detailed methodologies for assessing the impacts of DPM for roadway construction projects have not been developed. General interim methodologies have been developed. SCAQMD has published "Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions," to assess impacts of DPM near truck stops and warehouse facilities. Further, in their "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel Fueled Engines and Vehicles," the ARB modeled several "Risk Characterization Scenarios," two of which were high and low volume freeways. The methodology used in this analysis was developed from these two sources. The process involves calculating DPM concentrations along the road using a dispersion model. The resulting concentrations are then multiplied by a Unit Risk Factor (URF) to determine the potential cancer risk from the DPM. To determine the non-cancer risk, the concentration is divided by the Reference Exposure Level (REL) to determine the Hazard Index.

5.3.3 THRESHOLD OF SIGNIFICANCE

The SCAQMD CEQA Handbook has established a cancer risk significance threshold to evaluate the incremental health impact levels associated with projects in the SCAB. This threshold is 10 in one million (i.e., 1.0×10^{-5}). The Handbook was published in 1993. Although portions of it have been subsequently updated, this threshold has not changed. The SCAQMD has recently reaffirmed this threshold (Comment letter from SCAQMD on Draft Environmental Impact Report No. 573 dated February 22, 2000 signed by Steve Smith, SCAQMD Program Supervisor, Planning, Rules, and Area Sources.) Additionally, a review of thresholds of significance by regulation or adopted by various agency was undertaken. Over thirty documents with references to acceptable levels of cancer risk were reviewed. This review indicated that the 10 in one million is an appropriate threshold of significance for evaluating significance of cancer risk from DPM. This equates to a concentration of DPM of 0.0333 $\mu g/m^3$ for a residential receptor. Criteria developed in SCAQMD's "Risk Assessments Procedures for Rules 1401 and 212" was used to evaluate non-cancer impacts. A Hazard Index greater than 1 is considered significant.

5.3.4 IMPACT ANALYSIS ALONG I-5

Table 5-25 presents the calculated cancer risk along I-5. The highest non-residential cancer risk would be 8.9, which is not significant (non-residential cancer risks can be determined by multiplying the values in Table 5-25 by 0.14 to account for the decreased exposure time). The cancer risk per million is presented for the six receptors and four scenarios described above. The last three columns compare the I-5 Widening and corridor build conditions with the No Project conditions.

Table 5-25
Residential Calculated Cancer Risk Along I-5

	Distance From Edge of Roadway	Cancer Risk Per Million: No Project	Cancer Risk Per Million: I-5 Widening	Cancer Risk Per Million: Corridor Connects at Avenida Pico	Cancer Risk Per Million: Corridor Connects at OC/SDC Border	Change Over No Project: I-5 Widening	Change Over No Project: Corridor Connects at Avenida Pico	Change Over No Project: Corridor Connects at OC/SDC Border
Inland Side	122m (400')	15.3	16.6	16.8	13.7	1.3	1.4	-1.6
Inland Side	30.5m (100')	37.8	41.1	41.5	33.8	3.3	3.7	-4.0
Inland Side	6.1m (20')	60.7	63.2	63.7	54.2	2.5	3.1	-6.5
Coastal Side	6.1m (20')	28.2	30.9	31.2	25.2	2.7	3.0	-3.0
Coastal Side	30.5m (100')	14.7	16.2	16.3	13.1	1.4	1.6	-1.6
Coastal Side	122m (400')	6.1	6.5	6.6	5.4	0.4	0.5	-0.6
	Significance Threshold	**n/a**	**n/a**	**n/a**	**n/a**	**10.0**	**10.0**	**10.0**

n/a – Significance threshold is relative to change in risk caused by the project rather than the overall risk which includes risk that occurs without the project. Therefore, the significance threshold is not applicable to the overall risk factors.

Table 5-25 shows that cancer risks along I-5 are in excess of the significance threshold of 10 in one million. Along the inland side of the freeway the risk exceeds the significance threshold more than 122m (400') from the roadway. Along the coastal side, residences within about 61m (200') are exposed to DPM that results in a cancer risk in excess of the significance threshold. This occurs under the no project conditions as well as the corridor build conditions. These results are lower than the findings of the SCAQMD MATES-II report and ARB Diesel Risk Reduction plan. This is due to the use of newer emission factors that include DPM reduction measures that will be implemented in the future. These reduction measures were developed after the MATES-II study and in conjunction with Diesel Risk Reduction Plan and are not reflected in those reports.

The third and second to last columns show that the I-5 widening and corridor build option where a connection would be made at Avenida Pico result in only a slight increase in cancer risk. The significance threshold was developed to assess the incremental impact of a project accounting for the fact that other risk sources exist. The increase in cancer risk due to the project is much less than the significance threshold. Therefore, the implementation of the corridor build alternatives with a connection at Avenida Pico would not result in a significant adverse impact related to increased cancer risk along I-5 as a result of increased DPM exposure.

The last column of Table 5-25 shows that implementation of a corridor build alternative where the corridor connects to I-5 near the Orange County/San Diego County border would reduce cancer risks along I-5 through San Clemente. This is due to lower traffic volumes on the freeway. The greatest reductions in risk would occur closest to I-5. The reductions of cancer risk over the no project conditions are less than the significance threshold. Because the implementation of the corridor build alternatives with a connection to I-5 at the Orange County/San Diego County border would actually decrease cancer risk along I-5, they would not result in a significant impact.

The greatest reductions in risk with the corridor build alternative where the corridor connects to I-5 near the Orange County/San Diego County border compared to the I-5 Widening Alternative and the corridor build alternative where the connection is made to I-5 at Avenida Pico approaches the 10 per million significance threshold. The reduction in risk with the corridor build alternative with the Orange County/San Diego Count border connection varies in magnitude from a minor decrease to a more substantial decrease of 6.5 in one location.

5.3.5 IMPACT ANALYSIS ALONG CORRIDOR BUILD ALTERNATIVES

Table 5-26 presents the cancer risk calculated along the northern extent of the corridor build alternatives. The highest non-residential cancer risk would be 1.7 which is not significant (non-residential cancer risks can be determined by multiplying the values in Table 5-26 by 0.14 to account for the decreased exposure time). The cancer risk per million is presented for the ten receptors and three scenarios described above.

Table 5-26
Calculated Cancer Risks Along Northern Extent of Corridor Build Alternatives

	Distance From Edge of Roadway	Cancer Risk Per Million 4-Lane Corridor	4/8-Lane Corridor	8-Lane Corridor
To West	762m (2500')	0.6	0.6	0.6
	381m (1250')	1.1	1.1	1.2
	30.5m (100')	6.1	6.6	7.0
	15.2m (50')	8.1	8.9	9.4
	6.1m (20')	10.2	11.3	12.0
To East	6.1m (20')	3.9	4.7	5.0
	15.2m (50')	3.0	3.4	3.6
	30.5m (100')	2.3	2.5	2.6
	381m (1250')	0.4	0.4	0.4
	762m (2500')	0.2	0.2	0.2
Significance Threshold		**10.0**	**10.0**	**10.0**

Table 5-26 shows that cancer risks are projected to exceed the cancer risk significance threshold of 10 per million directly along the corridor to the west at a distance of 6.1m (20’) from the edge of the corridor. The typical right-of-way for the corridor build alternatives includes at least 20 feet from the edge of the travel way; in most cases there is an even greater distance of 28 to 34 feet. At 15.2m (50’) and beyond, increases are below the threshold of significance. In most cases, any receptors would be located outside the area with a significant cancer risk. The nearest existing residential receptors at the northern extent of the corridor are located 762m (2500') feet from the corridor where the cancer risk is well below the threshold. Therefore, the corridor build alternatives will not result in a significant adverse impact related to increased cancer risks as a result of increased DPM exposure along the northern extent.

Several corridor alternatives pass directly adjacent to residential developments near the southern extent (north of the connection with I-5). However, traffic volumes at the southern extents of the corridors are lower than at the northern extent, which was the area that was modeled for this analysis. To estimate the DPM concentrations at the southern end of the corridor they can be scaled by the ratio of traffic volumes at the northern and southern end. Note that this analysis does not take into account the different alignments of the corridor alternatives at the southern end but provides a reasonable estimate of the concentrations. This analysis shows that the traffic volumes are lowered such that DPM concentrations would be reduced as to not result in a cancer risk greater than 10 per million. Therefore, it is expected that the corridor build alternatives would not result in a significant adverse impact related to increased cancer risks as a result of increased DPM exposure along the southern extents.

5.3.6 MITIGATION

None of the SOCTIIP project alternatives by itself is projected to result in a significant impact and no mitigation is required. Congestion and slow speeds result in greater DPM emissions, concentrations and cancer risks compared to congestion free facilities. Reducing traffic congestion is a primary purpose of the project. No other project specific mitigation for DPM is available for a transportation facility where vehicles are moving at a steady pace on the facility. The reduction of DPM is planned on a statewide basis by CARB and EPA through emission standards and fuels as noted in Section 5.3.1, Background on Diesel Particulates. Other potential mitigation for DPM has focused on facilities with concentrations of trucks such as truck stops and warehouse distribution centers where operations can be controlled; this type of mitigation is not applicable to a public roadway.

SECTION 6.0
MITIGATION MEASURES

6.1 MITIGATION MEASURES FOR SHORT TERM IMPACTS

6.1.1 PARTICULATE EMISSION (PM10) CONTROL

AQ-1. All contractor specifications shall incorporate directions to contractors to control fugitive dust. Fugitive dust shall be controlled by regular watering, paving construction roads, or other dust preventive measures, as defined in SCQAMD Rule 403. After clearing, grading, earth moving or excavation the following shall occur:

a. Seeding and watering will be performed until viable vegetation cover is in place.
b. Soil binders will be spread.
c. Areas will be wet down sufficiently to form a crust on the surface. Repeated soakings will be performed as necessary to maintain this crust.

AQ-2. Measures contained in Tables 1 and 2 of SCAQMD Rule 403 will be implemented during construction. Control of particulate emissions from construction activities is best controlled through the requirements contained in SCAQMD's Rule 403, Tables 1 and 2. Tables 1 and 2 are reproduced here as Figures 6-1, 6-2A and 6-2B. The measures contained in these tables are presented as an option to air quality monitoring in Rule 403. Figure 6-1 contains measures such as maintaining an adequate moisture content in the soil, watering grading areas, establishing ground cover in inactive areas and watering unpaved roads. Figures 6-2A and 6-2B identify additional measures that are applied during high wind conditions. The mitigation measure, therefore, is to require that the measures contained in Tables 1 and 2 of Rule 403 be utilized. This potentially results in a much higher reduction of particulate emissions than if the air monitoring option contained in Rule 403 was employed. The air monitoring option requires monitoring around the project site, and as long as pollutant levels do not exceed threshold limits, no pollutant emission reduction measures are employed. The measure would be triggered prior to the initiation of grading.

AQ-3. All public streets adjacent to the project site shall be swept once a day if visible soil materials are carried to adjacent streets (recommend water sweepers with reclaimed water). This condition would apply to those areas where construction traffic leaves the project site and travels onto public roadways.

AQ-4. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash trucks and any equipment leaving the site each trip.

6.1.2 CONSTRUCTION EQUIPMENT EMISSION CONTROL

Emissions generated by construction equipment will exceed SCAQMD thresholds. The generation of these emissions is almost entirely due to engine combustion in construction equipment and employee commuting. The measures below address these emissions.

AQ-5. All contractor specifications shall require that contractors implement the following measures:

- Use low emission mobile construction equipment.
- Maintain construction equipment engines by keeping them tuned.
- Use low sulfur fuel for stationary construction equipment. This is required by SCAQMD Rules 431.1 and 431.2.
- Utilize existing power sources (i.e., power poles) when feasible. This measure would minimize the use of higher polluting gas or diesel generators.
- Configure construction parking to minimize traffic interference.
- Minimize obstruction of through-traffic lanes. When feasible, construction should be planned so that lane closures on existing streets are kept to a minimum.
- Schedule construction operations affecting traffic for off-peak hours.
- Develop a traffic plan to minimize traffic flow interference from construction activities (the plan may include advance public notice of routing, use of public transportation and satellite parking areas with a shuttle service.
- Include in construction grading plans a statement that work crews shut off equipment when not in use.
- Support and encourage ridesharing and transit incentives for the construction crew.

6.2 MITIGATION MEASURES FOR LONG TERM IMPACTS

The most significant reductions in regional and local air pollutant emissions are attainable through programs that reduce the vehicular travel associated with the project. Support and compliance with the AQMP for the basin is the most important measure to achieve this goal. The AQMP includes improvement of mass transit facilities and implementation of vehicular usage reduction programs. The project alternatives, except the FEC-OHV, FEC-APV, CC-ALPV, CC-OHV, A7C-ALPV, A7C-OHV, AIO, AIP, and I-5 Widening are consistent with the AQMP.

The AQMP includes two measures that are applicable to the SOCTIIP build alternatives. These measures are included to insure consistency with the measures contained in the AQMP. These measures are taken directly from Appendix IV of the AQMP.

AQ-6. This control measure specifies three "preventive" and one "mitigative" control option(s) that would be mandatory of all unpaved road connections with paved public roads. The four mandatory control options include:

- Paving the last 100 feet from an unpaved roadway connection with a paved road;
- Chemical stabilization of the last 100 feet from an unpaved roadway connection with a paved road at sufficient frequency and concentration to maintain a stabilized surface at all times.
- Installation of dirt removal devices (e.g., tire cleaning device, grizzlies, etc.);
- Cleaning of public paved road surface at any time visible track-out occurs.

AQ-7. Any material deposited onto paved roads due to a major storm event must be removed within 72 hours of the event. Additional time is allowed for mudslides or similar events that block traffic over the material. In the event of road closures due to mudslides or other overwhelming accumulations of material, public access should be restricted until all the material is removed.

SECTION 7.0
CEQA SIGNIFICANCE

7.1 CEQA THRESHOLDS OF SIGNIFCANCE

While the California Environmental Quality Act (CEQA) requires that each effect having a significant impact be identified in an Environmental Impact Report (EIR). In this section, references to significant air quality impacts are made to fulfill the requirements of CEQA. No representation as to significance is made which represents an assessment as to magnitude of an impact under the National Environmental Policy Act (NEPA). Under NEPA, no such determination need be made for each environmental effect. The fact that an EIS is being prepared for this project represents FHWA's assessment that overall this project has potential significant impacts (beneficial and adverse) on the quality of the environment.

Air quality impacts of a project fall into three major categories:

> Construction Impacts. Airborne particulates from grading, demolition and excavation and gaseous and particulate emissions from heavy equipment, trucks and employee vehicles used during construction.
> Operational Regional Impacts. Increases or decreases in regional emissions resulting from higher vehicle miles traveled or changes in speeds for the SOCTIIP build alternatives compared to the No Action Alternatives.
> Operational Local Impacts. Increases in carbon monoxide (CO) exceedances or an increase in the severity of exceedances as a result of increased traffic or congestion at intersections and ramps affected by the SOCTIIP build alternatives.

"Federal Regulations for Implementing Procedural Provisions of the National Environmental Policy Act (NEPA)" (40 C.F.R. Section 1500 et seq.) are not specific about what constitutes a significant impact and require that the project's impact be evaluated in the context of where the impacts occur (Section 1508.27 (a)). Criteria that relate particularly to air quality include the degree to which the proposed action affects public health or safety (Section 1508.27 (b) (2); whether the action is related to other actions with individually insignificant but cumulatively significant impacts (Section 1508.27(b)(7)); and whether the action threatens a violation of federal, state or local law or requirements imposed for the protection of the environment (Section 1508.27(b)(10). It is, therefore, necessary to review state and local criteria in determining what constitutes a significant adverse impact on air quality NEPA.

A project would be considered to result in an adverse impact if the resulting air quality violates any ambient air quality standard (AAQS), contributes substantially to an existing or projected air quality violation, or exposes sensitive receptors to substantial pollutant concentrations. In addition, a project will normally have a significant effect if it conflicts with adopted environmental plans and goals of the community where it is located.

The South Coast Air Quality Management District (SCAQMD) has established specific thresholds to assist local agencies in determining when a project would contribute substantially to an existing or future violation of an air quality standard and thus have a significant effect on the environment in the South Coast Air Basin (SCAB). These thresholds are shown in Table 7-1. The TCA has determined that there are appropriate thresholds for air quality.

TABLE 7-1

SCAQMD Emission Thresholds Of Significance

Pollutant	Threshold		
	Construction		Operation
	kilograms/day (pounds/day)	tonnes/quarter (tons/quarter)	kilograms/day (pounds/day)
Carbon Monoxide (CO)	249 (550)	22.45 (24.75)	249.48 (550)
Reactive Organic Compounds (ROC)	34 (75)	2.27 (2.5)	24.95 (55)
Nitrogen Oxides (NO_x)	45 (100)	2.27 (2.5)	24.95 (55)
Sulfur Oxides (SO_x)	68 (150)	6.12 (6.75)	68.04 (150)
Particulate Matter (PM10)	68 (150)	6.12 (6.75)	68.04 (150)

Source: South Coast Air Quality Management District. CEQA Air Quality Handbook, (November, 1993).

Increases in CO concentrations are significant if they cause an exceedance of state 1-hour or 8-hour standards. According to the "CEQA Air Quality Handbook," any project-related one-hour average increase in CO greater than one ppm is considered significant if background levels already exceed the state 1-hour CO standard. An 8-hour average increase in CO of 0.45 ppm is significant if background levels exceed the state eight-hour CO standard.

The SCAQMD CEQA Air Quality Handbook also contains quarterly thresholds of significance. However, the Handbook states that if emissions on an individual day exceed the daily thresholds shown in Table 7-1, project impacts should be considered significant and quarterly emissions need not be analyzed.

Because the San Diego County Air Pollution Control District does not review CEQA documents and does not have recommended thresholds of significance for air quality impacts, the SCAQMD's significance thresholds are used for CEQA purposes in this report to determine the significance of all air quality impacts associated with the SOCTIIP alternatives. These thresholds represent worst case determinations for the alternatives in the San Diego Air Basin, which has less degraded air quality than the SCAB.

7.2 CONSTRUCTION IMPACTS

The short term construction emissions due to the proposed build alternatives with mitigation measures will be substantially reduced but the exact extent of reduction can not be quantified. However, the emissions would still be significant for all air pollutants for all SOCTIIP build alternatives.

7.3 OPERATIONAL REGIONAL IMPACTS

There will be long term regional air quality impacts due to the SOCTIIP build alternatives. HC emissions will decrease for all alternatives in comparison to the No Action alternative. Some alternatives show larger decreases of HC than other alternatives. The alternatives that show the largest decreases in HC emissions are FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, CC, A7C, A7C-FECV (including the A7C-FEC-M), and A7-FECV-C. All of the listed alternatives had a decrease of at least 25 kg. per day (55 lbs. per day), which is the significance threshold. The seven alternatives listed would have substantial benefit on HC emissions for the region/subregion in comparison to the No Action alternative.

All the build alternatives show a decrease in CO emissions in comparison to the No Action Alternative. Some alternatives show greater decreases in CO emissions than others. Those with decreases greater than 550 pounds per day include FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, FEC-APV, CC, CC-ALPV, A7C, A7C-FECV (including the A7C-FEC-M), and A7-FECV-C. These nine alternatives would have a substantial benefit on CO levels for the region.

All build alternatives show an increase in NOx emissions, except for two alternatives which show a slight decrease in emissions. Several alternatives have increases in emissions above 25 kilograms per day (55 pounds per day), and these increases should be considered an adverse impact. Alternatives which have increases greater than 25 kilograms per day (55 pounds per day) include FEC (including the FEC-W and the FEC-M), FEC-TV, FEC-CV, FEC-APV, CC, A7C, A7C-FECV (including the A7C-FEC-M), A7-FECV-C, AIP, and the I-5. No alternatives have decreases greater than 25 kilograms per day (55 lbs. per day).

Most of the build alternatives show a slight increase in PM10 emissions, and some show a slight decrease in emissions in comparison to the No Action alternative. None of the increases or decreases is greater than 68 kilograms per day (150 pounds per day), and so none of the changes should be considered significant.

7.4 OPERATIONAL LOCAL IMPACTS

For all SOCTIIP build alternatives, the future CO emissions are projected to be in compliance with the 1-hour and 8-hour state and federal AAQS, and therefore, the local CO impacts due to all alternatives are not considered significant.

Future PM10 concentrations are projected to be in compliance with the federal 24-hour PM10 standard for all SOCTIIP build alternatives. However, the PM10 concentrations for all SOCTIIP build alternatives are projected to exceed the state standard. This is because the background PM10 emissions are projected to be over the state standard. The increase in PM10 levels due to the SOCTIIP build alternatives are very small and are not considered to be a significant impact. Therefore, none of the SOCTIIP build alternatives will result in significant adverse local air impacts.

7.5 CUMULATIVE IMPACTS

The I-5 Alternative and ultimate corridor alternatives in a toll-free condition for the cumulative scenario would result in a significant adverse increase in HC emissions. All SOCTIIP build alternatives for cumulative conditions, except the AIO, would result in significant adverse increases in CO and NOx emissions.

SECTION 8.0
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SECTION 9.0
LIST OF PREPARERS

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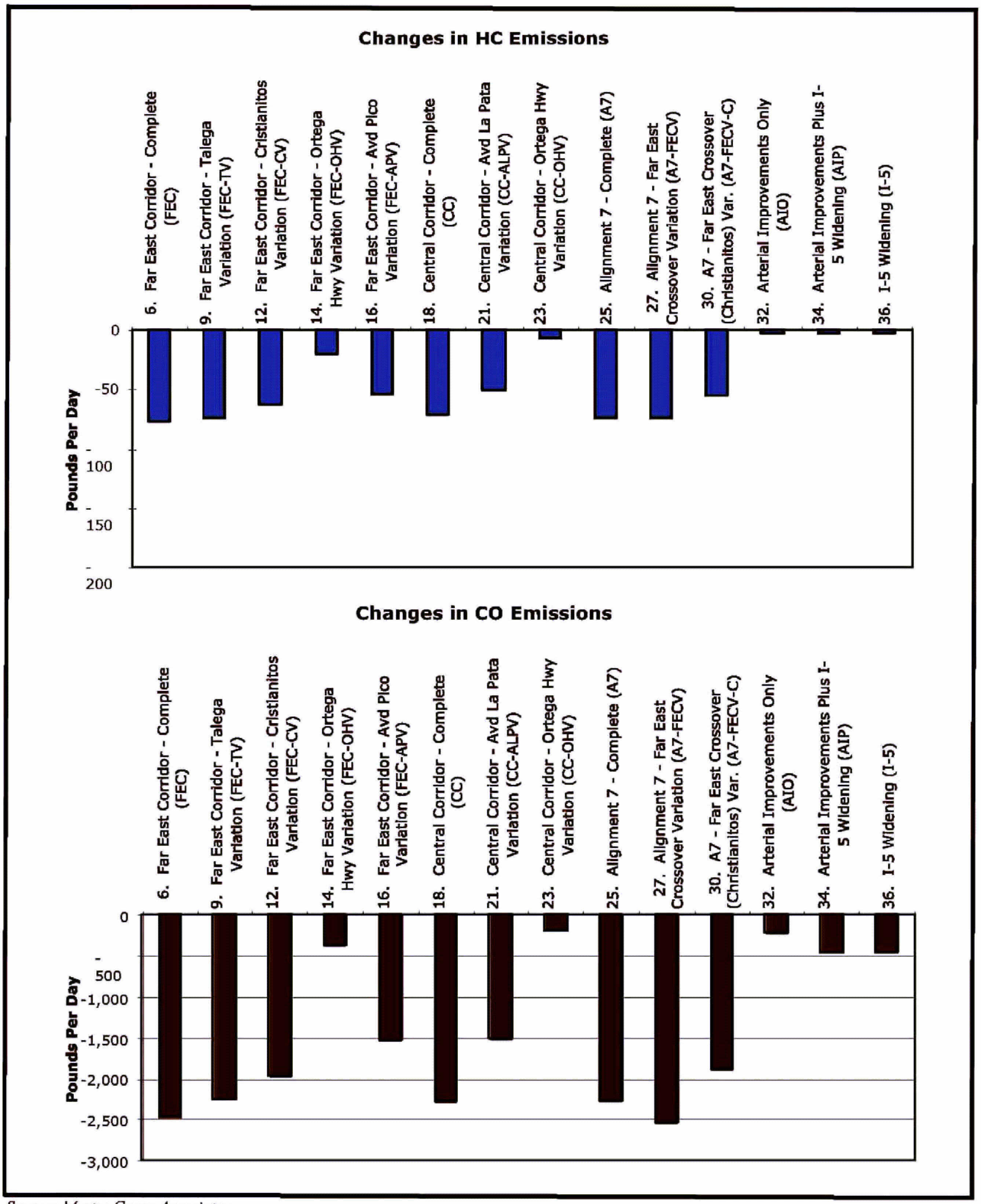
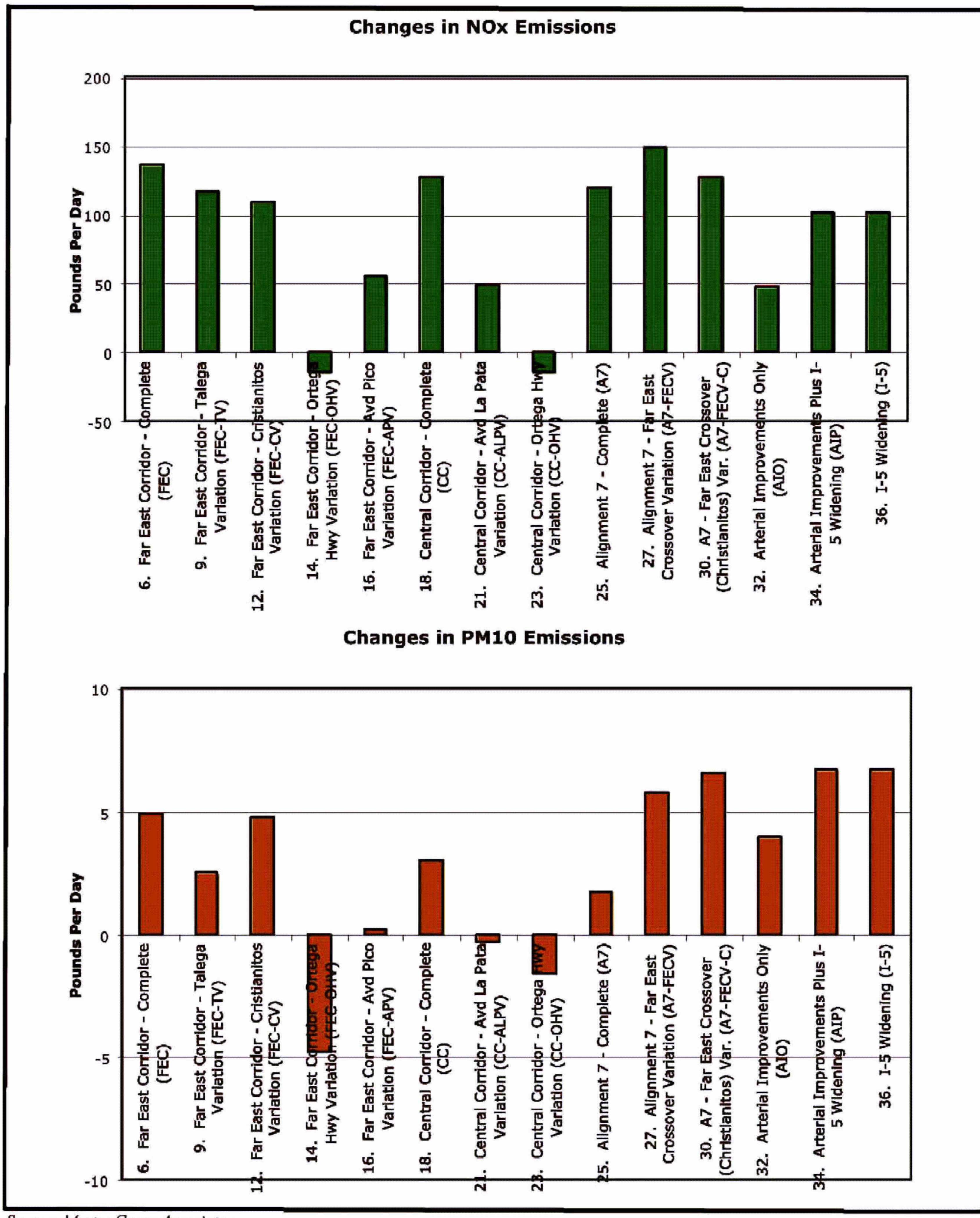
Tanya Moon	Air Quality Analyst, BS in Electrical Engineering; over 12 years experience in air quality and noise assessments.



Source: Mestre Greve Associates

Emission Changes for HC and CO



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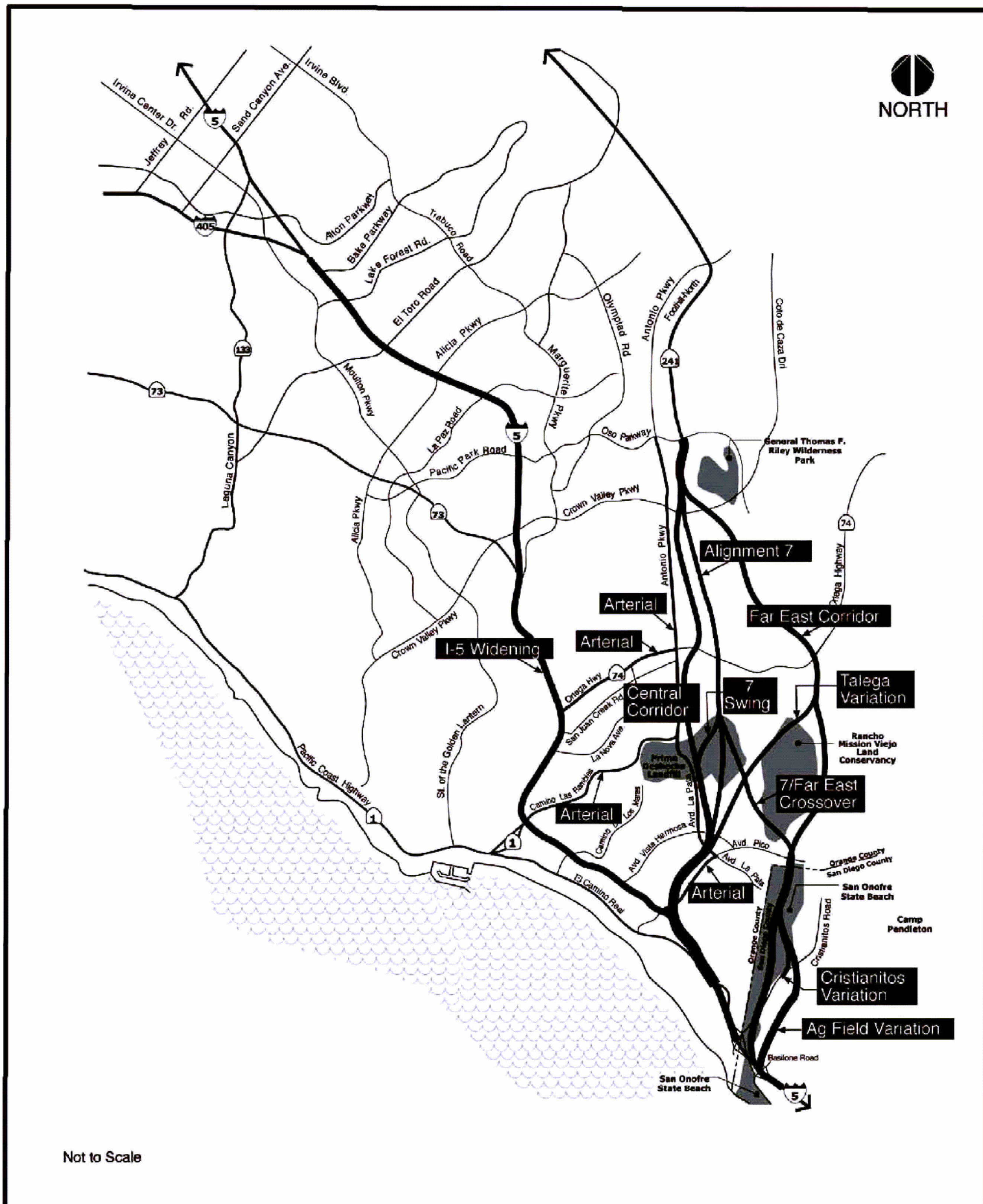
Emission Changes for NOx and PM10



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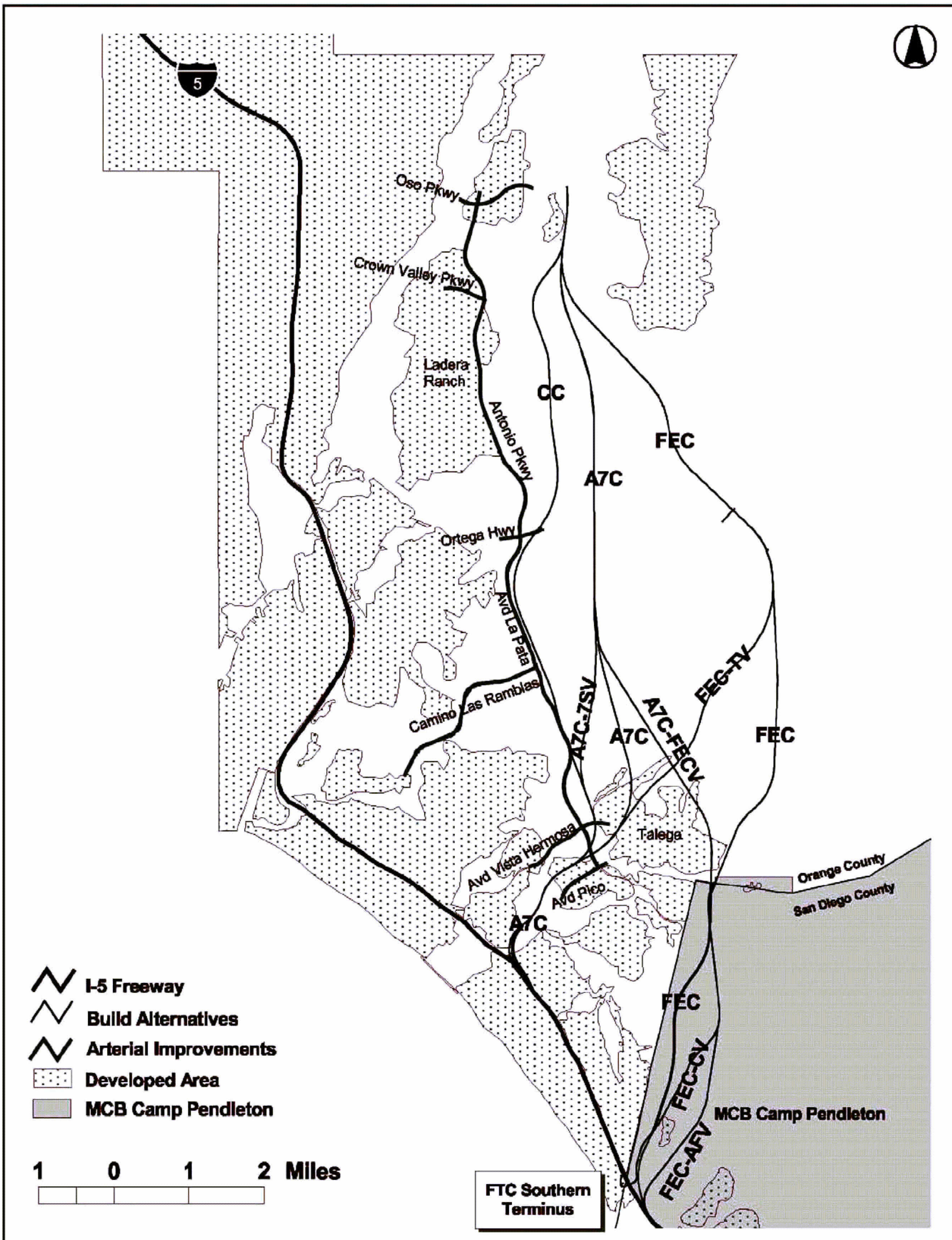
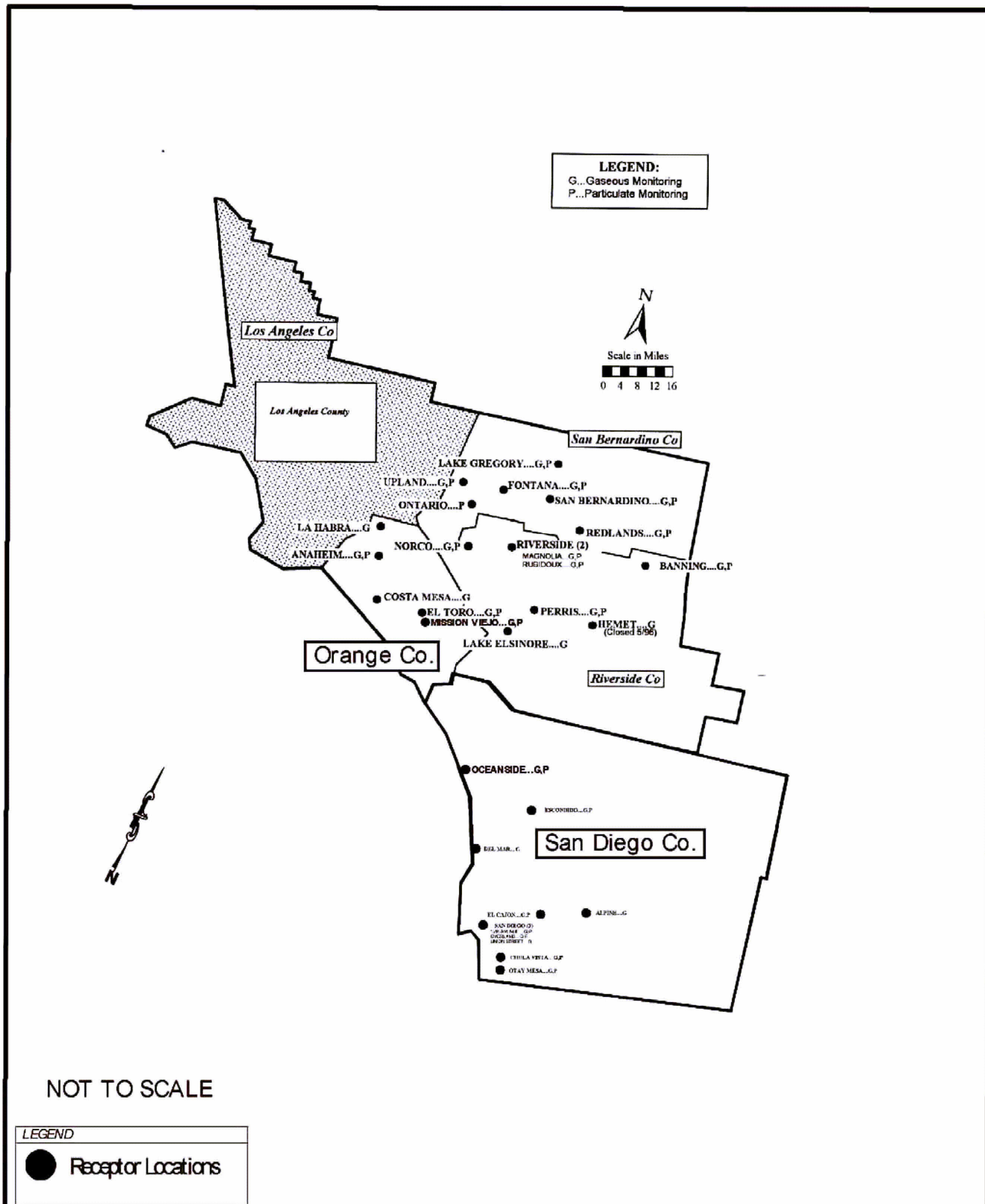
SOCTIIP Build Alternatives



Developed Areas

SOCTIIP EIS/SEIR
AIR QUALITY REPORT

Figure 3-1



Source: Mestre Greve Associates

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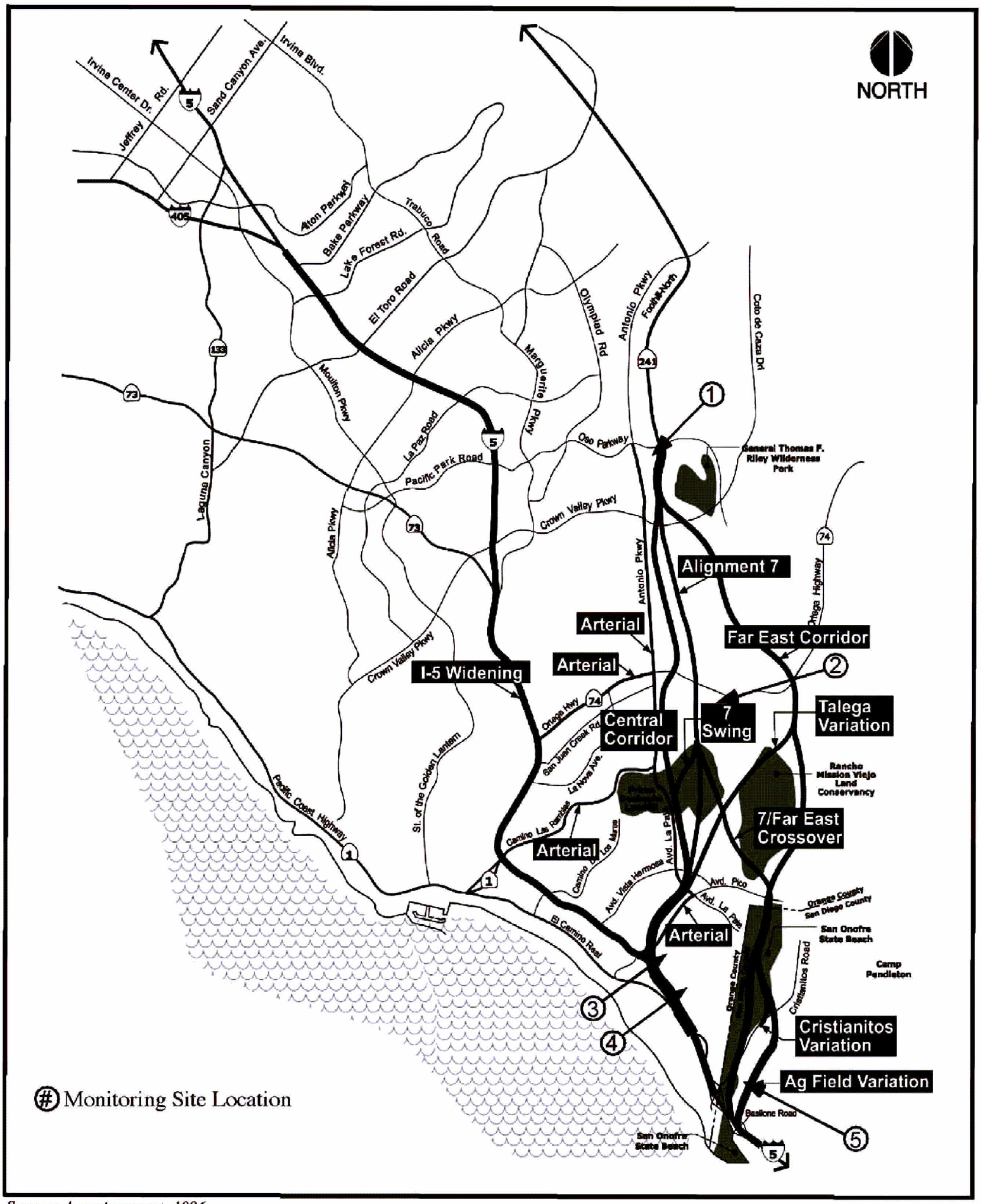

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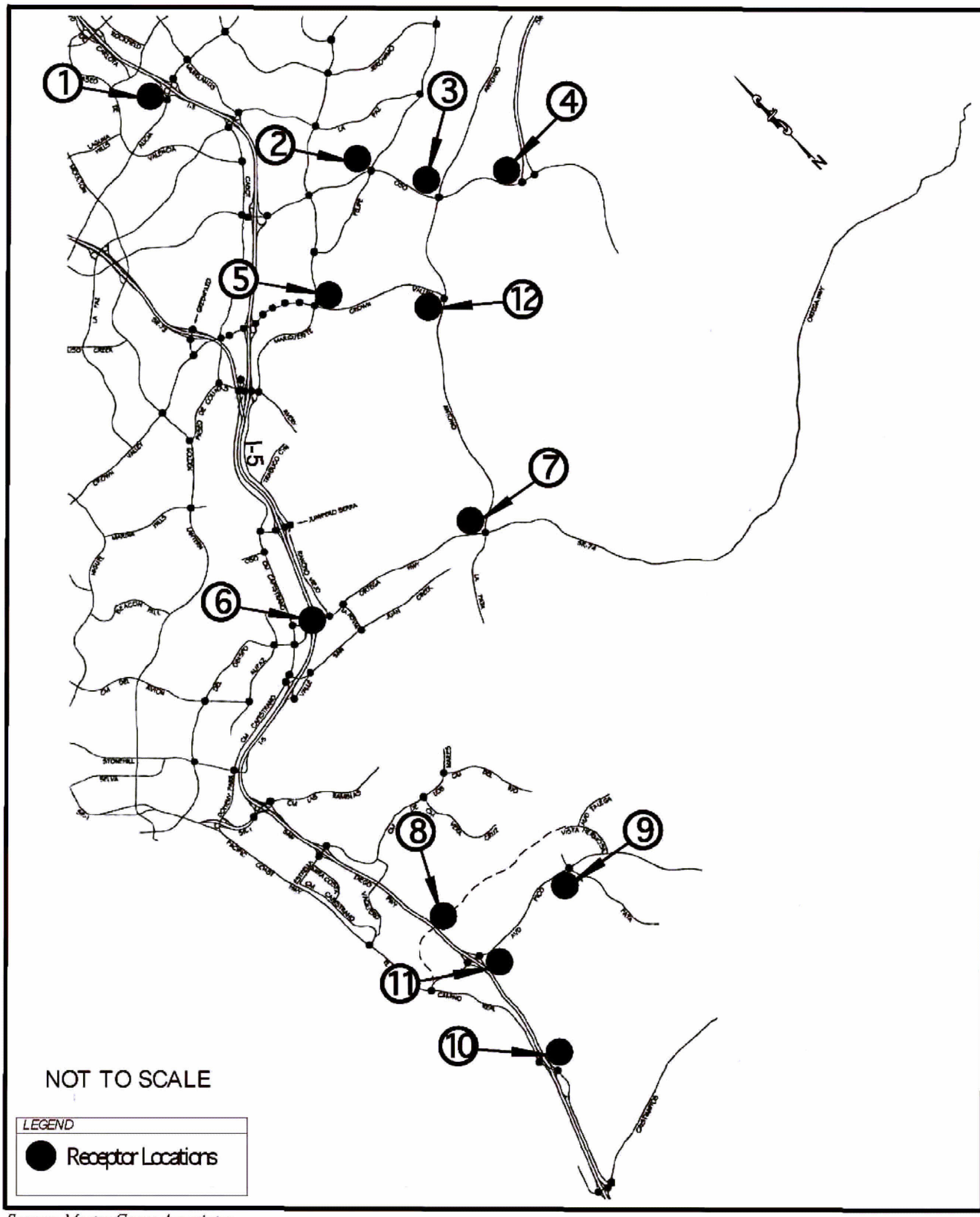
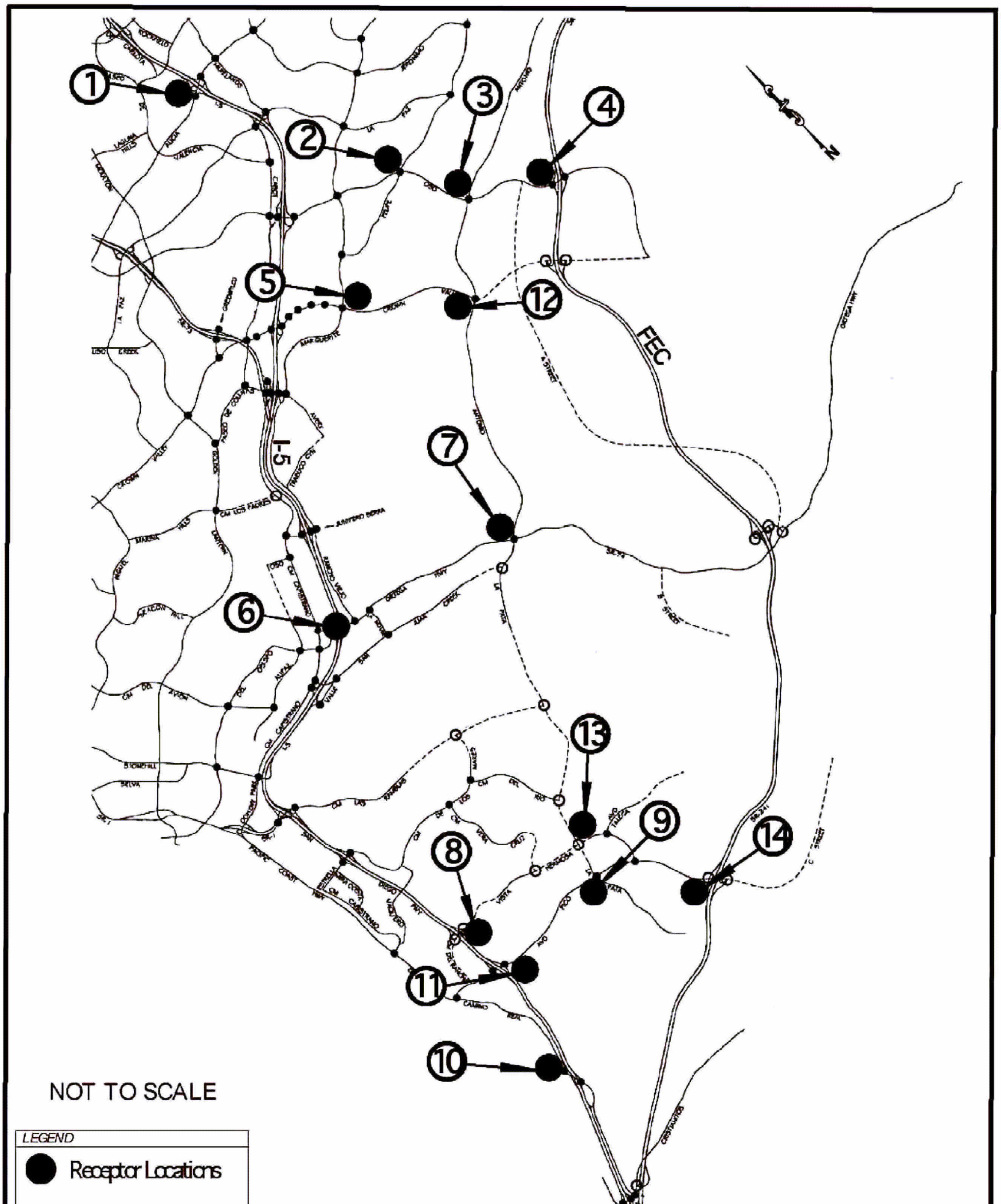


Source: Mestre Greve Associates

CALINE4 Modeling Receptor Locations
Existing 2002



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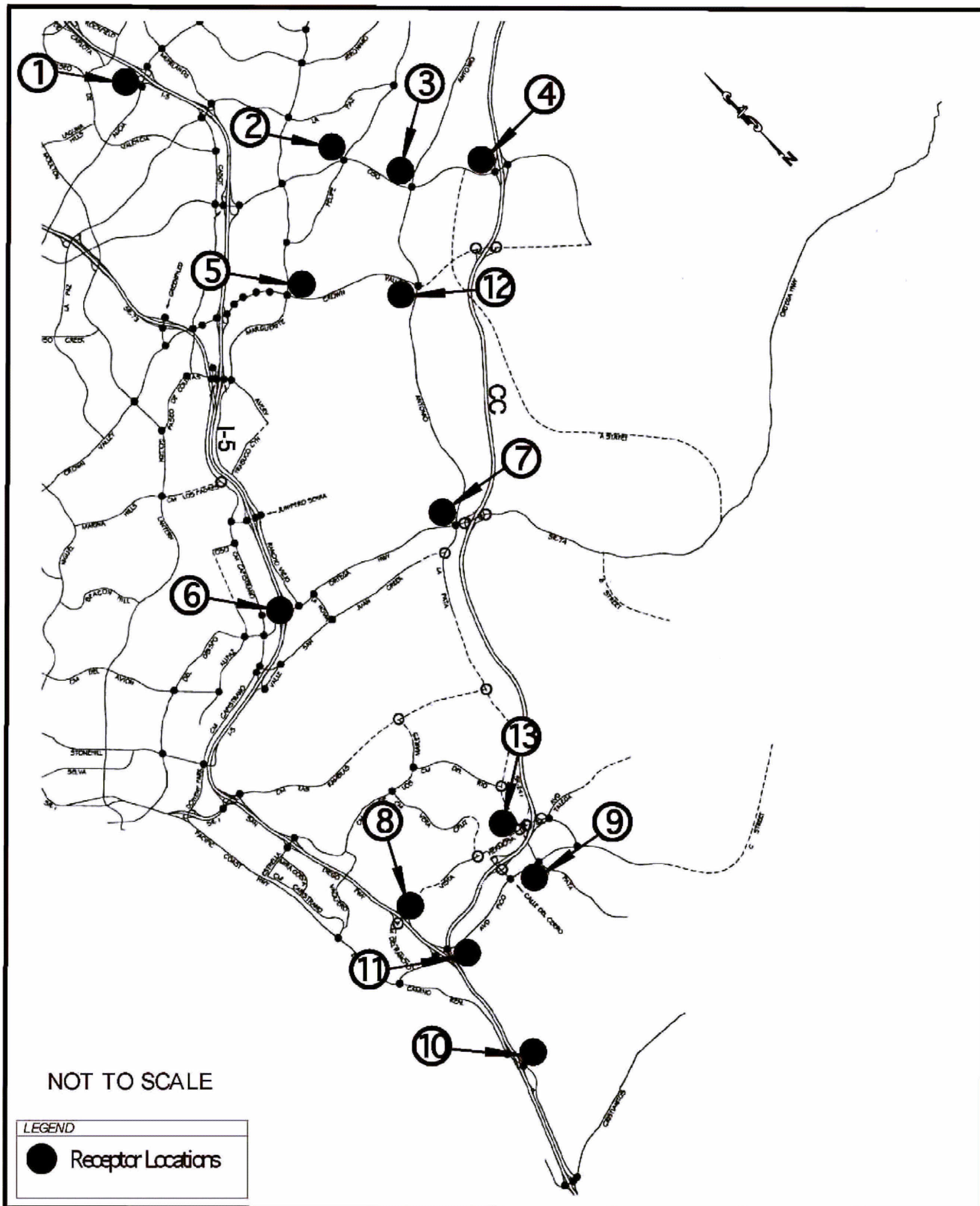
CALINE4 Modeling Receptor Locations - FEC Alternative



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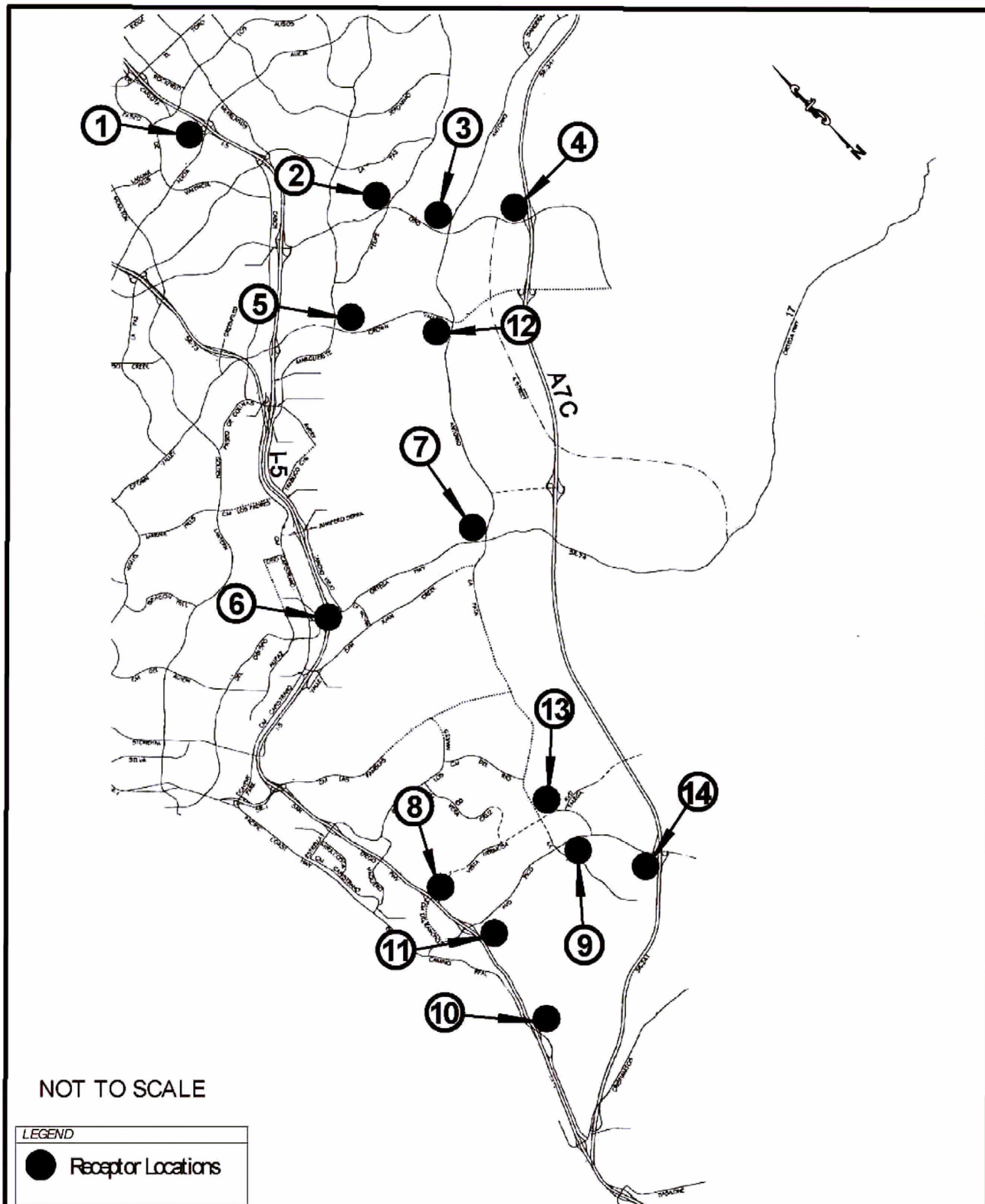
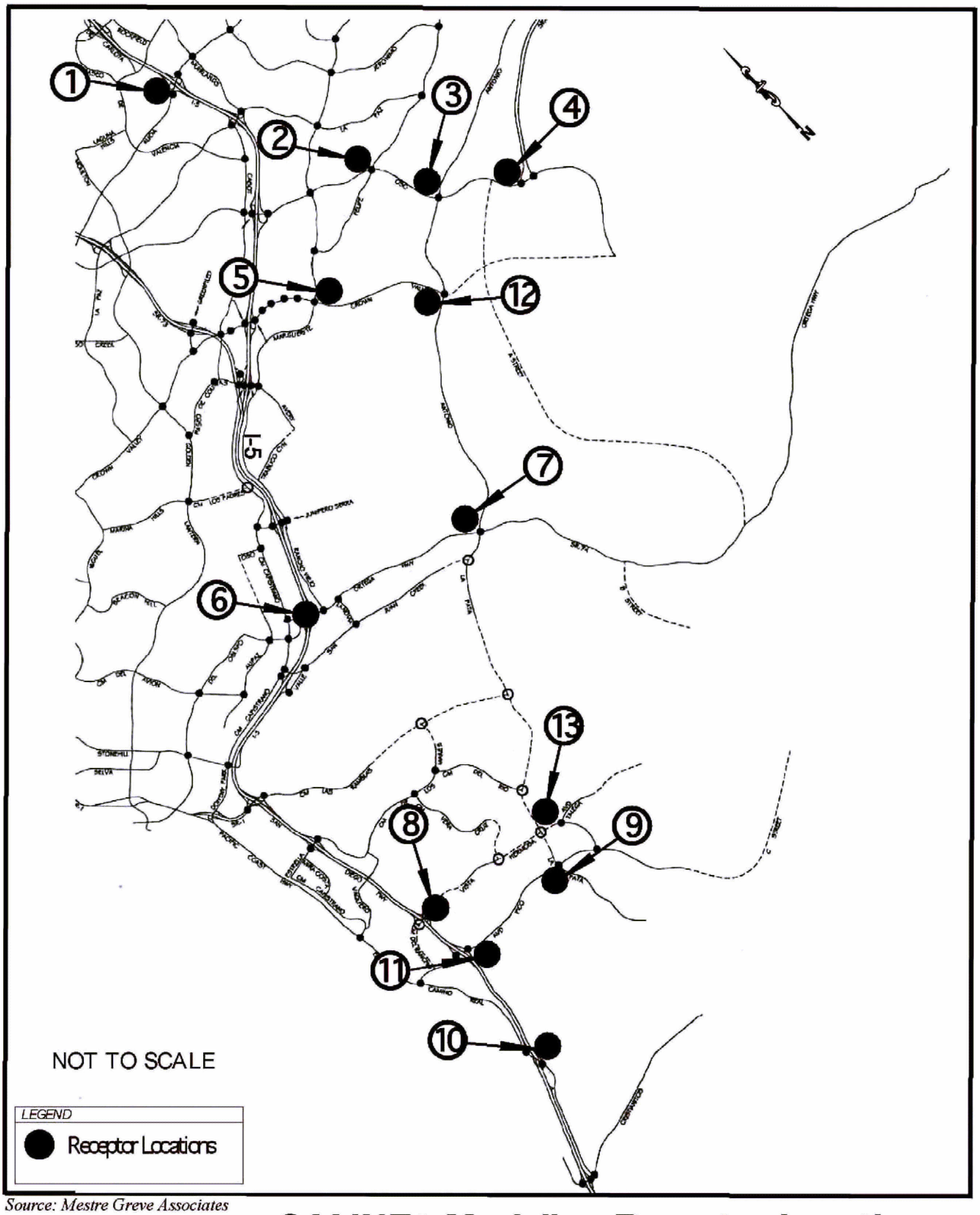


Source: Mestre Greve Associates

CALINE4 Modeling Receptor Locations - A7C Alternative

SOCTIIP EIS/SEIR
AIR QUALITY REPORT

Figure 4-3



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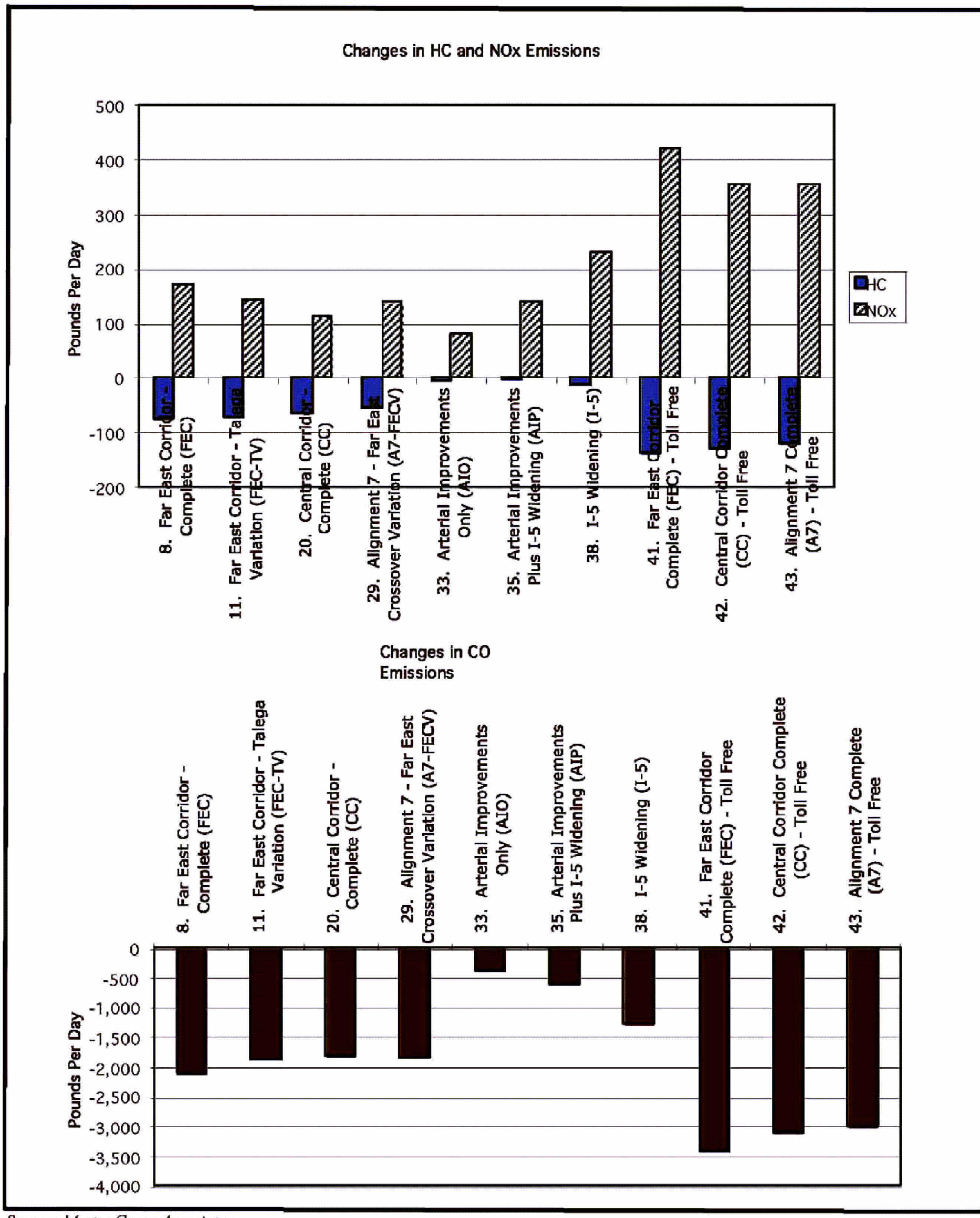
CALINE4 Modeling Receptor Locations - NA, AIO and I-5 Alternatives



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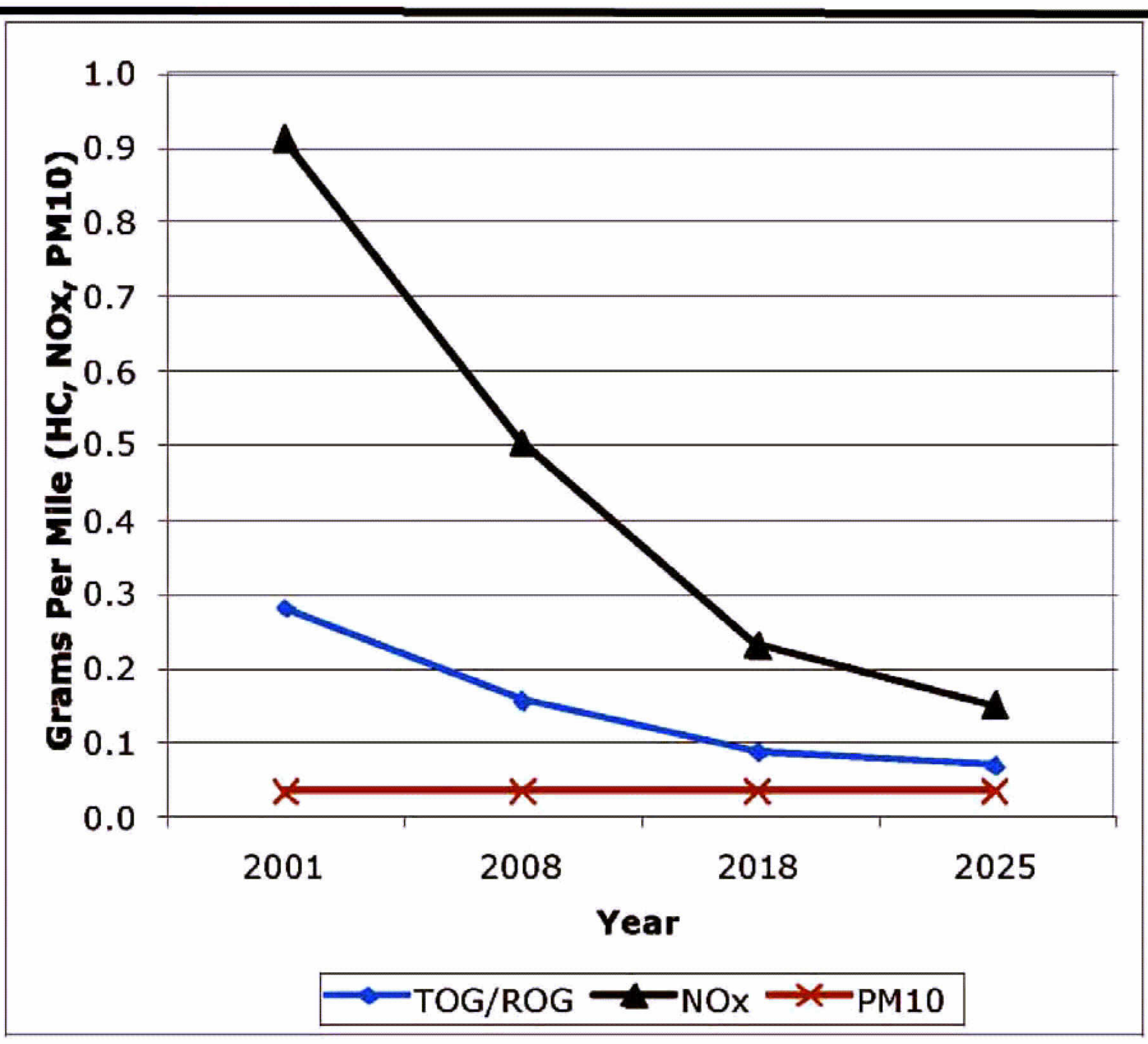
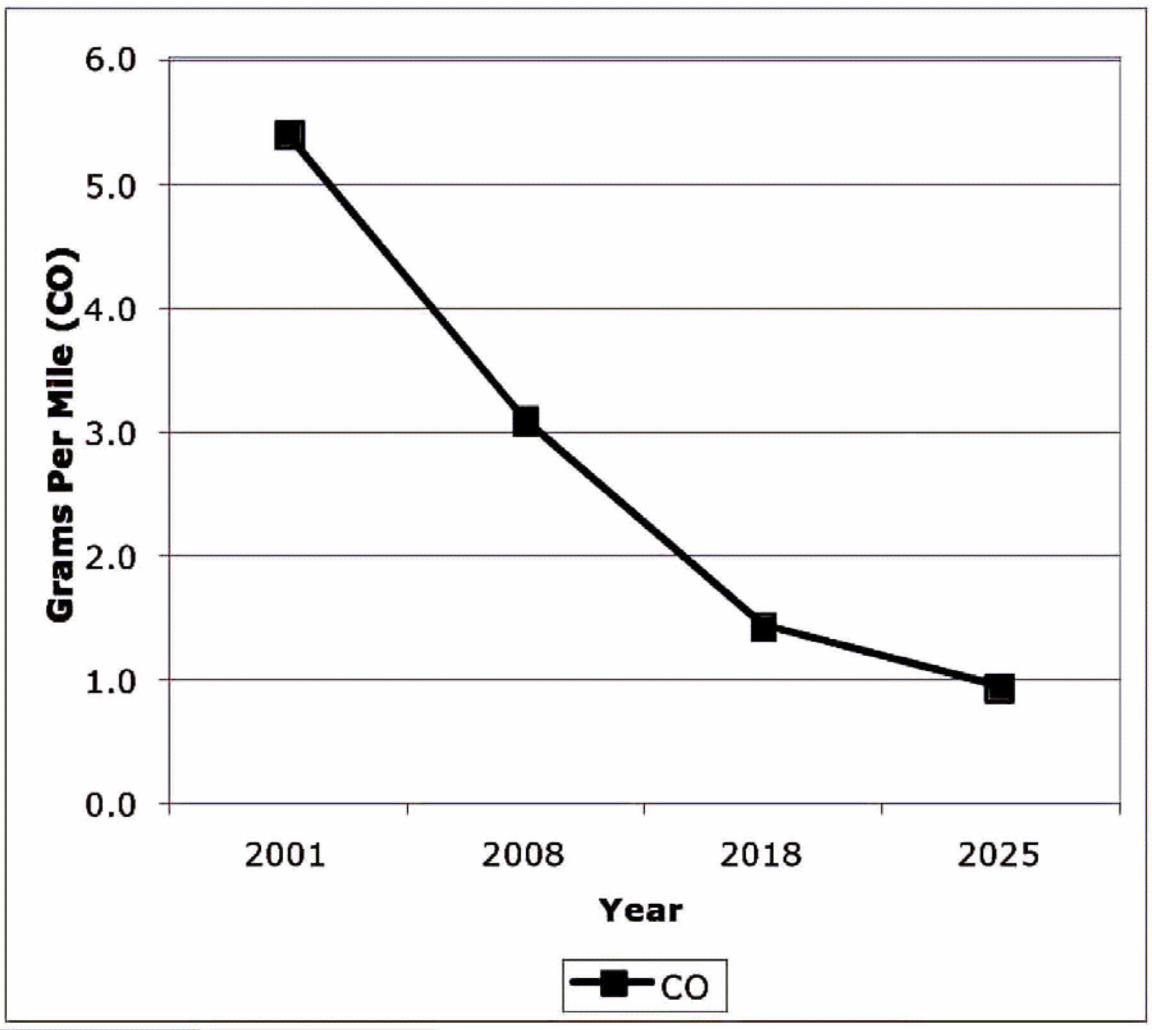
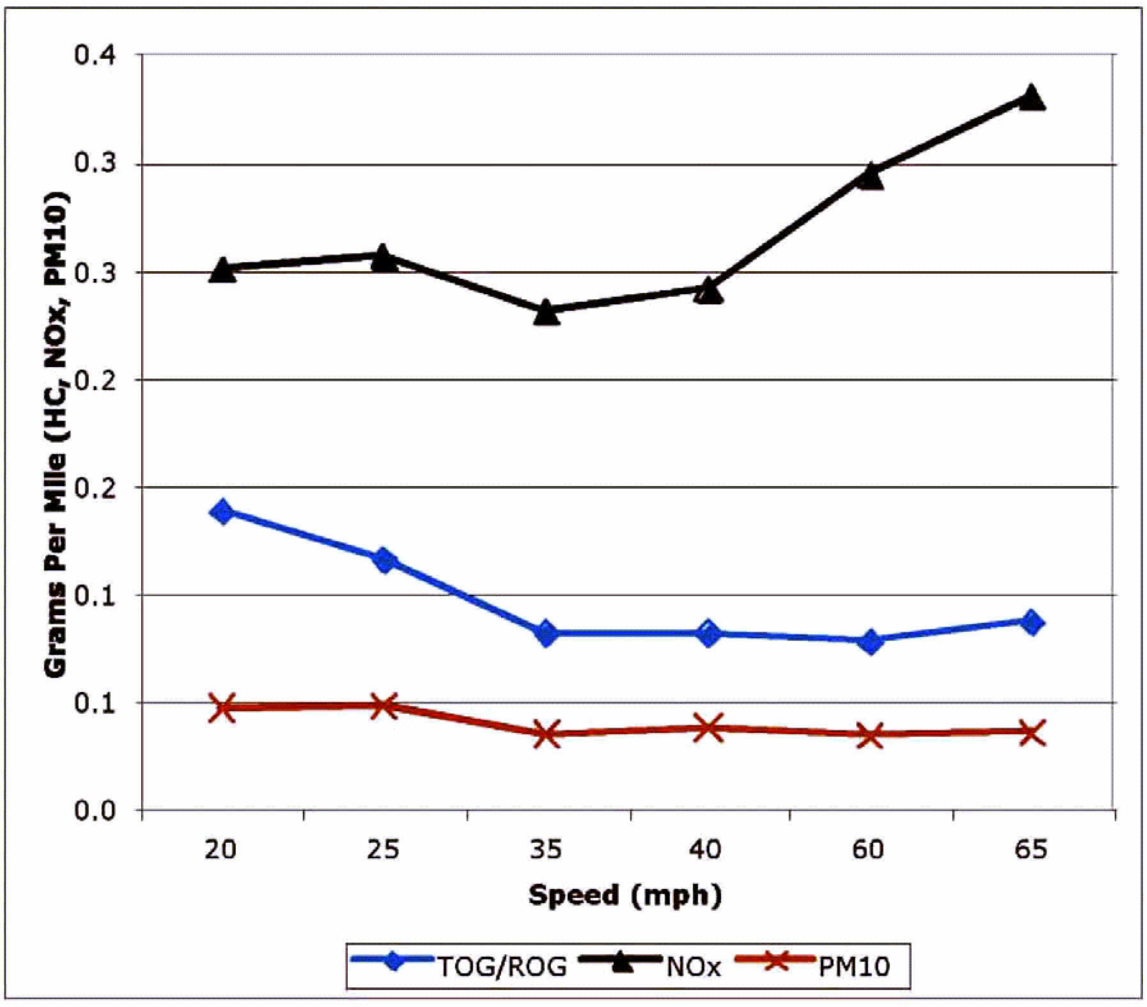
Changes in Emissions for Cumulative Scenarios

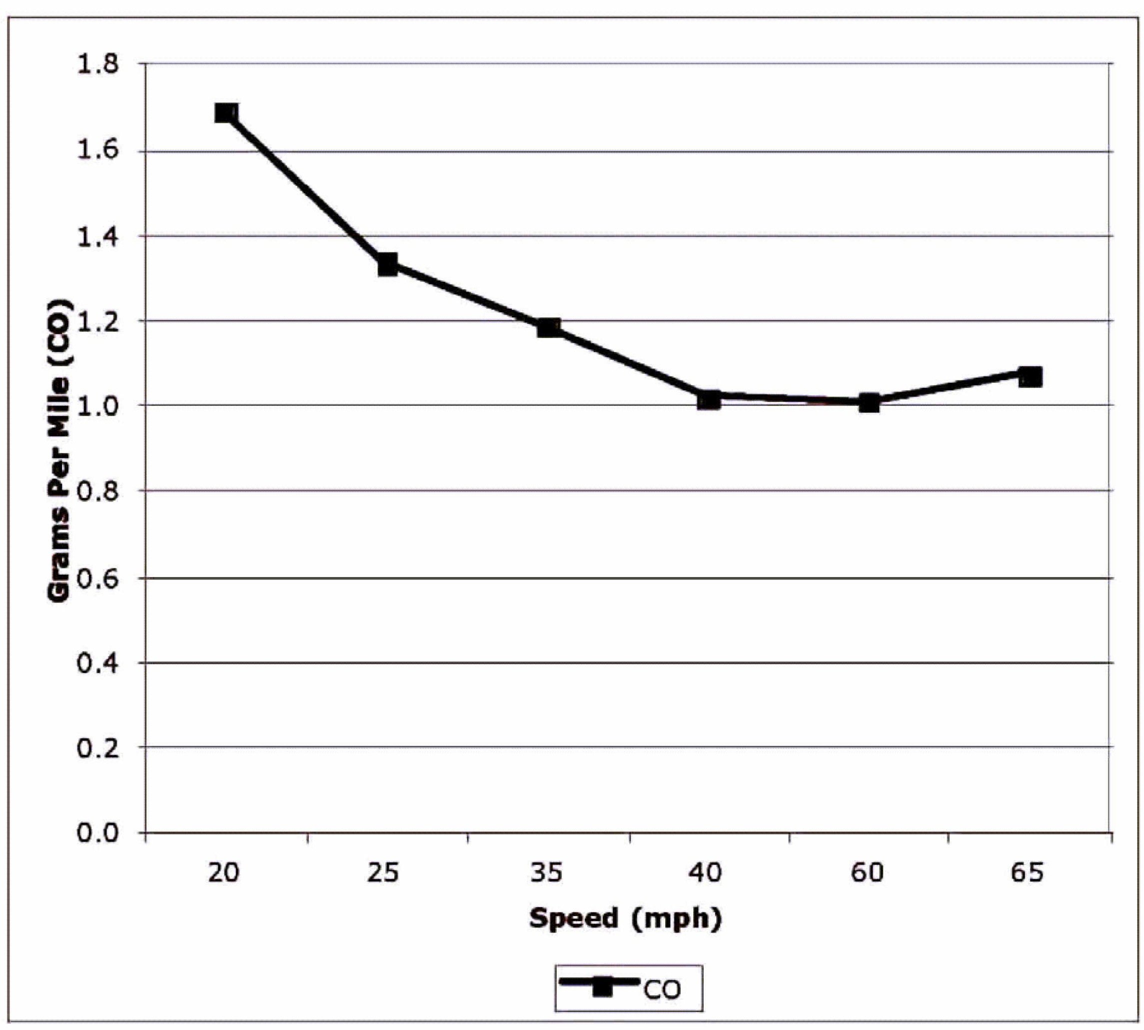




Source: Mestre Greve Associates

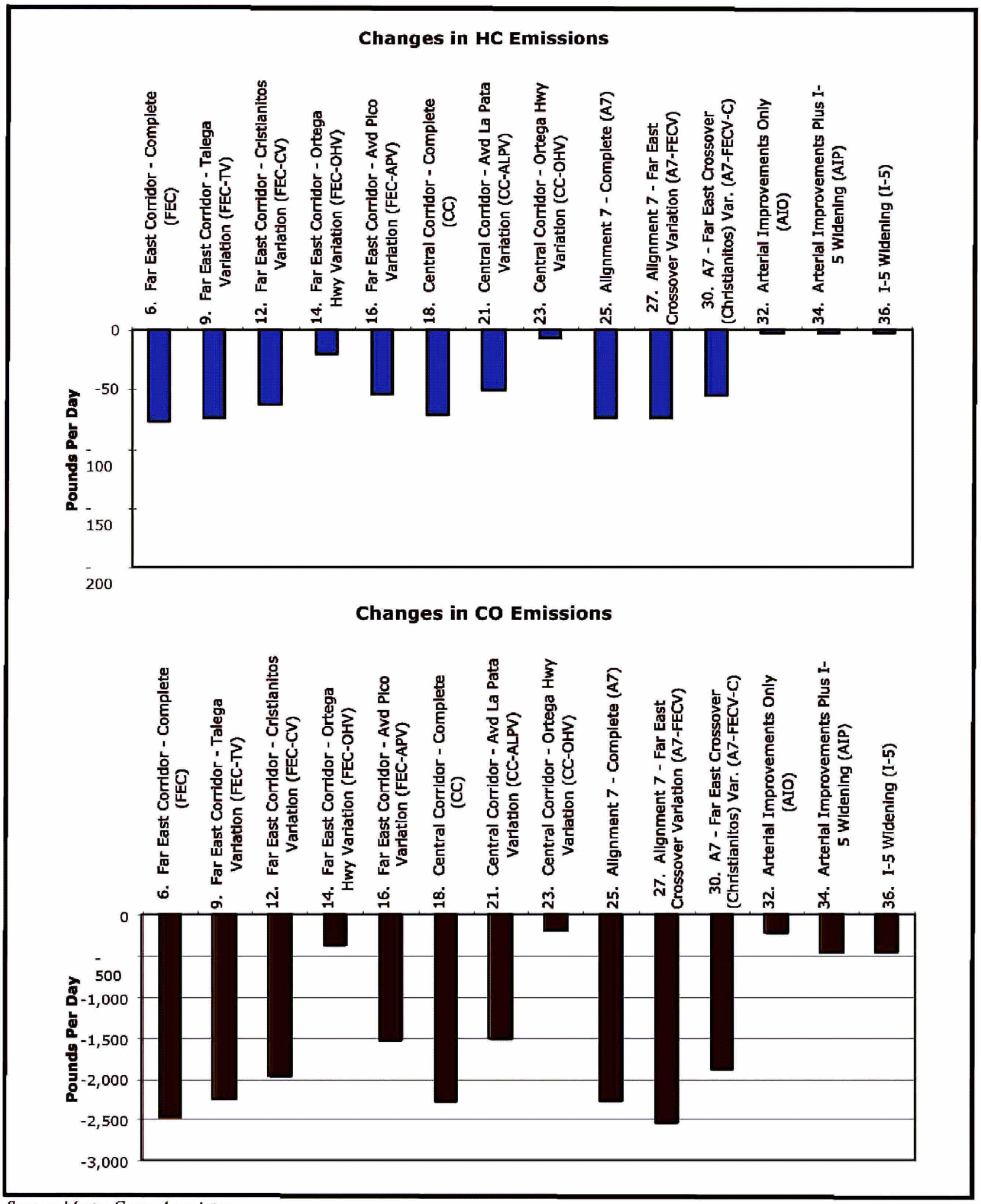
Vehicular Emission Trends





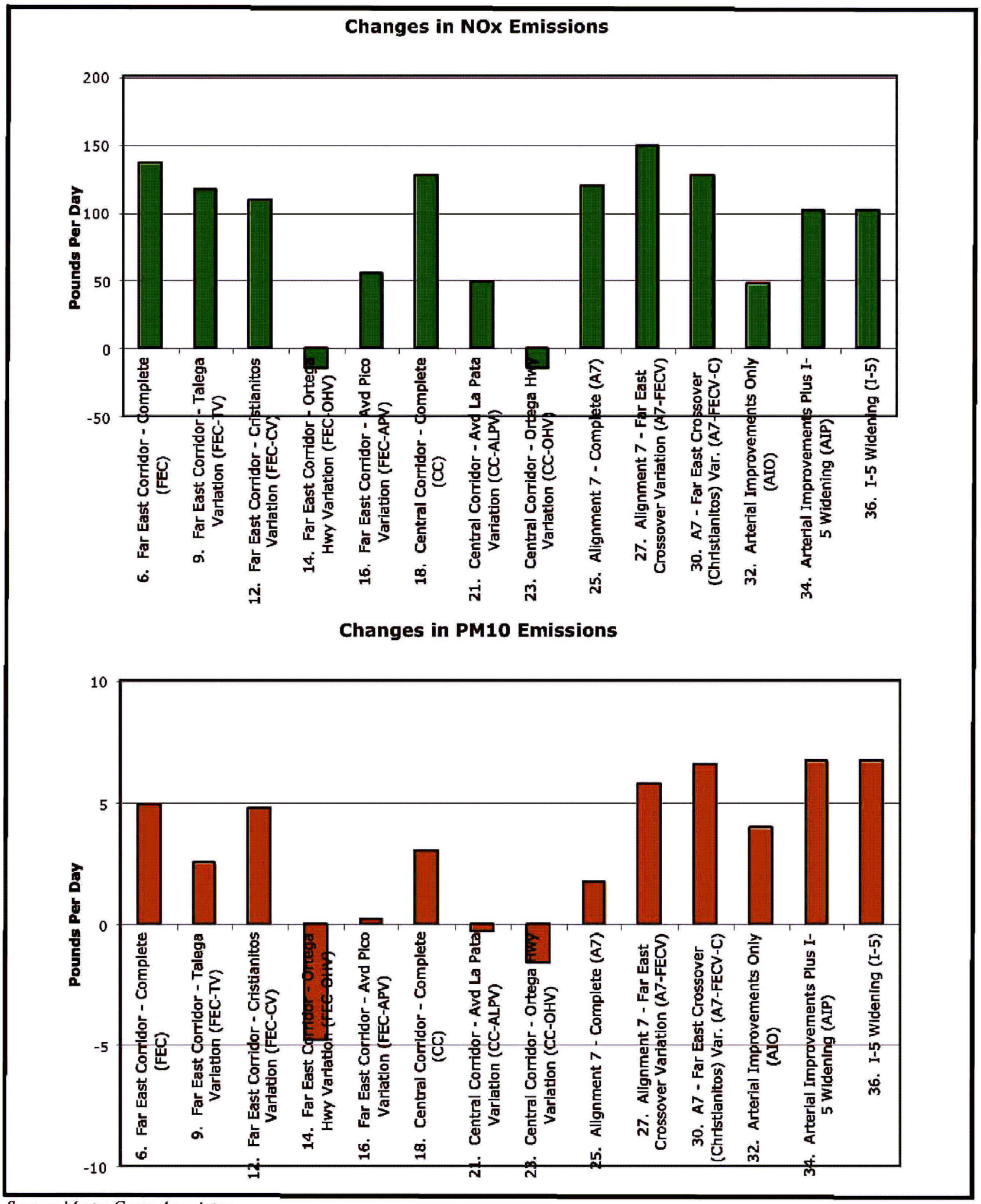
Source: Mestre Greve Associates

Vehicular Emission Trends



Source: Mestre Greve Associates

Emission Changes for HC and CO



Source: Mestre Greve Associates

Emission Changes for NOx and PM10

TABLE 1

BEST [REASONABLY]* AVAILABLE CONTROL MEASURES FOR HIGH WIND CONDITIONS

FUGITIVE DUST SOURCE CATEGORY	CONTROL MEASURES
Earth-moving	(1A) Cease all active operations; OR (2A) Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B) On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR (1B) Apply chemical stabilizers prior to wind event; OR (2B) Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR (3B) Take the actions specified in Table 2, Item (3c); OR (4B) Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C) Apply chemical stabilizers prior to wind event, OR (2C) Apply water twice per hour during active operation, OR (3C) Stop all vehicular traffic.
Open storage piles	(1D) Apply water twice per hour; OR (2D) Install temporary coverings.
Paved road track-out	(1E) Cover all haul vehicles; OR (2E) Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 1 may be used.

Table 1 of SCAQMD Rule 403

TABLE 2

DUST CONTROL ACTIONS FOR EXEMPTION FROM PARAGRAPH (d)(3)*

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c)	Apply chemical stabilizers within five working days of grading completion; OR
	(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.

Table 2 of SCAQMD Rule 403

TABLE 2 (Continued)*

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Inactive disturbed surface areas	(3a)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	(3c)	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers, OR
	(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings, OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

Table 2 of SCAQMD Rule 403 (Continued)