3.2.6 Air Quality

3.2.6.1 Regulatory Setting

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

Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under NEPA. In addition to this type of environmental analysis, a parallel "Conformity" requirement under the FCAA also applies.

Conformity

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

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

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

Conformity analysis at the project level includes verification that the project is included in the regional conformity analysis and a "hot-spot" analysis if an area is "nonattainment" or "maintenance" for CO and/or particulate matter (PM_{10} or $PM_{2.5}$). A region is "nonattainment" if one or more of the monitoring stations in the region measures a violation of the relevant standard and EPA officially designates the area nonattainment. Areas that were previously designated as nonattainment areas but subsequently meet the standard may be officially redesignated to attainment by EPA and are then called "maintenance" areas. "Hot-spot" analysis is essentially the same, for technical purposes, as CO or PM analysis performed for NEPA purposes. Conformity does include some specific procedural and documentation standards for projects that require a hot-spot analysis. In general, projects must not cause the "hot spot"-related standard to be violated and must not cause any increase in the number and severity of violations in nonattainment areas. If a known CO or PM violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well. Federal, state, and local regulations are summarized further below.

Federal

The federal standards are summarized in Table 3.2.6-1, and the attainment status is provided in Table 3.2.6-2. EPA has classified the South Coast Air Basin (SCAB) as maintenance for PM_{10}, CO, and NO_2 and nonattainment for O_3 and $PM_{2.5}$.

Table 3.2.6-1: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemi-luminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		53 ppb (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		

Table 3.2.6-1: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[5]	Secondary[3,6]	Method[7]
Visibility Reducing Particles[12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m³)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m³)	Gas Chromatography			

1. California standards for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles) are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than O_3, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

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

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

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

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

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

8. To attain the 1-hour national standard, the 3-year average of the annual 98^{th} percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards, the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.

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

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

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

11. The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until 1-year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

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

Table 3.2.6-2: South Coast Air Basin Attainment Status

Pollutant	Attainment Status Basis		Health and Atmospheric Effects
	National Standard	California Standard	
Ozone (O_3), 1-hour average	N/A [a]	Extreme Nonattainment	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include a number of known toxic air contaminants.
Ozone (O_3), 8-hour average	Extreme Nonattainment	Nonattainment	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include a number of known toxic air contaminants.
PM_{10}	Maintenance	Nonattainment	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many aerosol and solid compounds are part of PM_{10}.
$PM_{2.5}$	Nonattainment	Nonattainment	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – considered a toxic air contaminant – is in the $PM_{2.5}$ size range. Many aerosol and solid compounds are part of $PM_{2.5}$.
Carbon Monoxide (CO)	Attainment/ Maintenance [b]	Attainment [b]	Asphyxiant. CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen.
Nitrogen Dioxide (NO_2)	Attainment/ Maintenance	Nonattainment [c]	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain. Part of the "NO_x" group of ozone precursors.
Sulfur Dioxide (SO_2)	Attainment	Attainment	Irritates respiratory tract; injures lung tissue. Can have yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.
Lead (Pb)	Attainment	Attainment	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a TAC and water pollutant.

Table 3.2.6-2: South Coast Air Basin Attainment Status

Pollutant	Attainment Status Basis		Health and Atmospheric Effects
	National Standard	California Standard	
Visibility Reducing Particles	N/A	Unclassified	Reduces visibility. Produces Haze. Note: Not related to Regional Haze Program under the FCAA, which is oriented primarily toward visibility issues in National Parks and other “Class I” areas.
Sulfates (SO_4^{2-})	N/A	Attainment	Neurological effects, liver damage, cancer. Also considered a TAC.
Hydrogen Sulfide (H_2S)	N/A	Unclassified	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea.
Vinyl Chloride	N/A	Unclassified	Neurological effects, liver damage, cancer. Also considered a TAC.

N/A = not applicable

[a] The National 1-hour O_3 standard was revoked on June 15, 2005.

[b] The SCAB was redesignated by EPA as attainment for CO effective June 11, 2007.

[c] State NO_2 standard was amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. These changes become effective after regulatory changes are approved by the Office of Administrative Law. The attainment status provided in this table is based on the old standard.

Source: http://www.arb.ca.gov/desig/adm/adm.htm.

State

California Air Resources Board

In California, the CCAA is administered by the CARB at the state level and by air quality management districts and air pollution control districts at the regional and local levels. The CARB, which became part of the California Environmental Protection Agency (Cal/EPA) in 1991, is responsible for meeting the state requirements of the FCAA, administering the CCAA, and establishing the California Ambient Air Quality Standards (CAAQS). The CCAA, as amended in 1992, requires all air districts in the state to endeavor to achieve and maintain the CAAQS. CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. CARB regulates mobile air pollution sources such as motor vehicles. CARB is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB established passenger vehicle fuel specifications, which became effective in March 1996. CARB oversees the functions of local air pollution control districts and air quality management districts, which, in turn, administer air quality activities at the regional and county levels. The state standards are summarized in Table 3.2.6-1, and the attainment status is provided in Table 3.2.6-2.

The CCAA requires CARB to designate areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a state standard for the pollutant was violated at least once during the previous 3 calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as nonattainment. Under the CCAA, the Orange County portion of the SCAB is designated as attainment for CO, SO_2, Pb, and SO_4^2 and nonattainment area for O_3, $PM_{2.5}$, $PM_{10,}$ and NO_2 (CARB 2012).

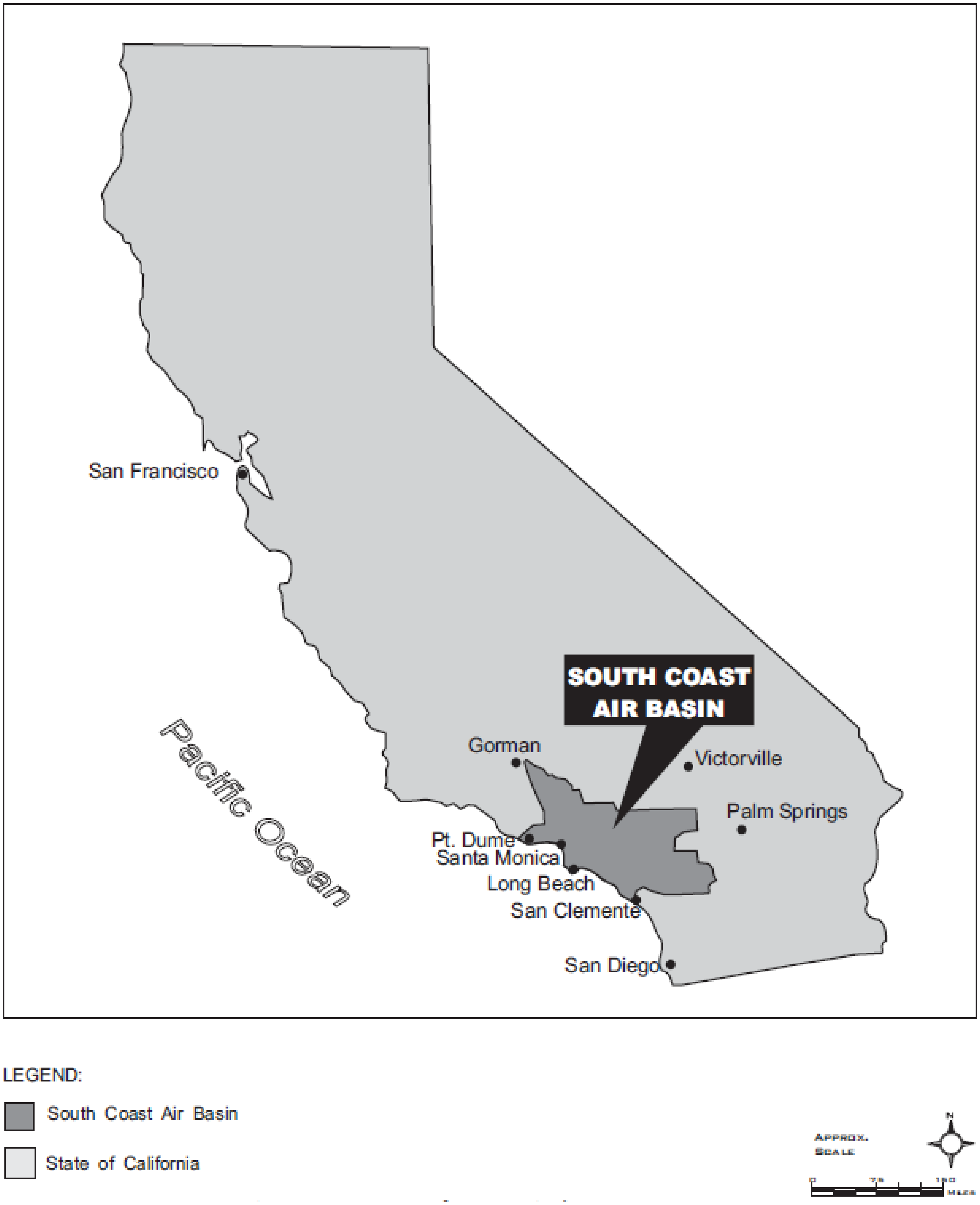
3.2.6.2 Affected Environment

An Air Quality Report (May 2011), Supplement to the Air Quality Report (February 2015), and the Air Quality Conformity Analysis (January 2015) were prepared as part of the proposed project to assess the impacts of the project on air quality locally and regionally. The information presented in this section is based on the results of the technical study.

Environmental Setting

The proposed project is located within the SCAB, which is a 6,600-square-mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east (Figure 3.2.6-1). Air quality regulation in the SCAB is administered by the South Coast Air Quality Management District (SCAQMD). The SCAB includes Orange County and the nondesert parts of Los Angeles, Riverside, and San Bernardino counties, in addition to the San Gorgonio Pass area of Riverside County. Its terrain and geographical location determine the distinctive climate of the SCAB, as it is a coastal plain with connecting broad valleys and low hills.

The SCAB is characterized as having a Mediterranean climate (a semiarid environment with mild winters, warm summers, and moderate rainfall). The general region lies in the semipermanent high-pressure zone of the eastern Pacific. As a result, the climate is mild and tempered by cool sea breezes. The extent and severity of the air pollution problem in the SCAB is a function of the area’s natural physical characteristics (i.e., weather and topography), as well as manmade influences (i.e., development patterns and lifestyle). Factors, such as wind, sunlight, temperature, humidity, rainfall, and topography, all affect the accumulation and/or dispersion of pollutants throughout the SCAB.



Source: California Air Resources Board, State and Local Air Monitoring Network Plan, May 2008

Figure 3.2.6-1: South Coast Air Basin

Climate

The SCAB is in an area of high air pollution potential due to its climate and topography. The general region lies in the semipermanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds. The basin experiences warm summers, mild winters, infrequent rainfalls, light winds, and moderate humidity. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean to the west and high mountains around the rest of its perimeter. The mountains and hills within the area contribute to the variation of rainfall, temperature, and winds throughout the region.

The basin experiences frequent temperature inversions. Temperature typically decreases with height; however, under inversion conditions, temperature increases as altitude increases, thereby preventing air close to the ground from mixing with the air above it. As a result, air pollutants are trapped near the ground. During the summer, air quality problems are created due to the interaction between the ocean surface and the lower layer of the atmosphere. This interaction creates a moist marine layer. An upper layer of warm air mass forms over the cool marine layer, preventing air pollutants from dispersing upward. Additionally, hydrocarbons and NO_2 react under strong sunlight, creating smog. Light daytime winds, predominantly from the west, further aggravate the condition by driving air pollutants inland, toward the mountains. During the fall and winter months, air quality problems are created due to CO and NO_2 emissions. CO concentrations are generally worse in the morning and late evening (around 10:00 p.m.). In the morning, CO levels are relatively high due to cold temperatures and the large number of traveling cars. High CO levels during the late evenings are a result of stagnant atmospheric conditions trapping CO in the area. Because CO emissions are produced almost entirely from automobiles, the highest CO concentrations in the basin are associated with heavy traffic. NO_2 concentrations are also generally higher during fall and winter days.

The mountains and hills within the basin contribute to the variation of rainfall, temperature, and winds throughout the region. Within the project area, the average wind speed, as recorded at the Costa Mesa Wind Monitoring Station, is approximately 3 mph, with calm winds occurring approximately 15 percent of the time. Wind in the project area predominantly blows from the southwest.

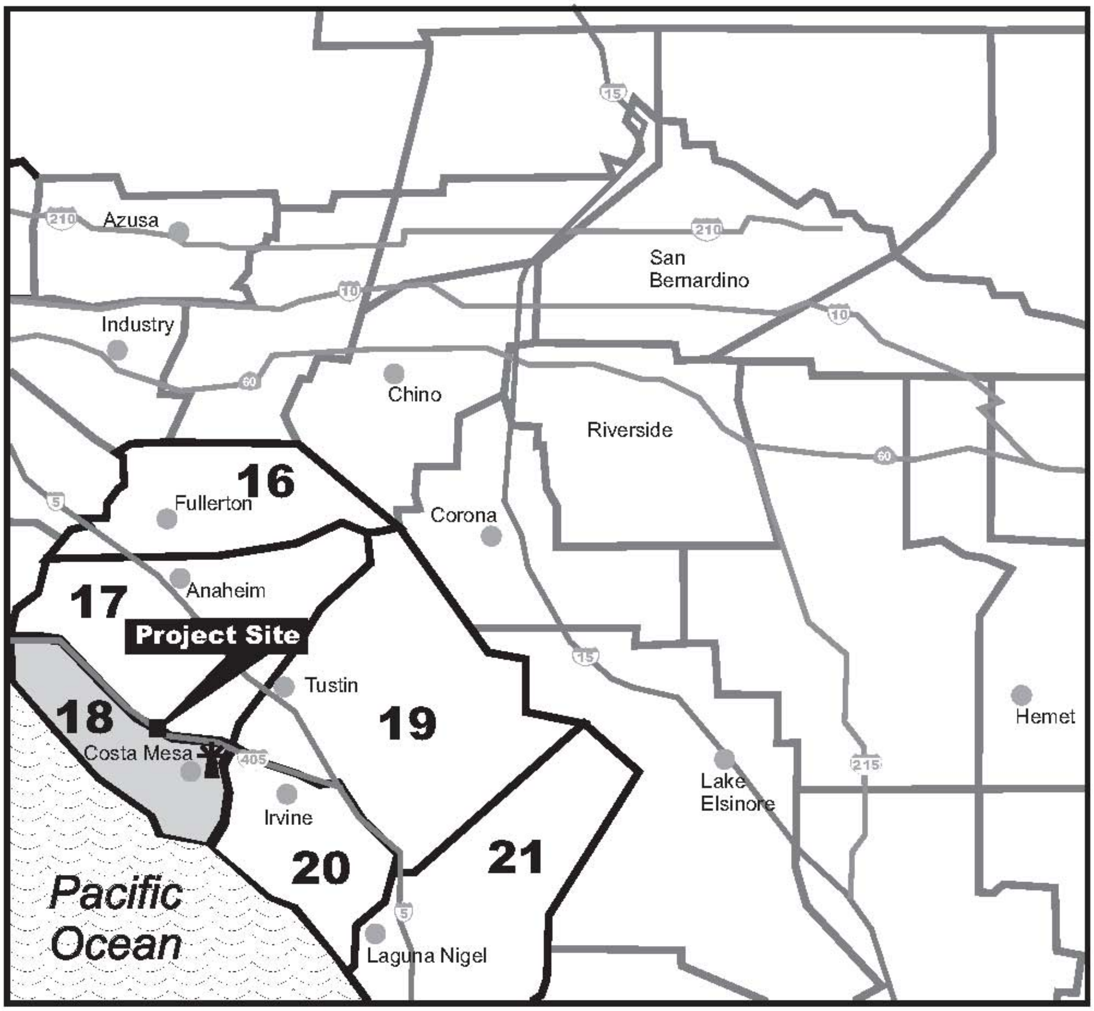
The annual average temperature in the project area is 64°F (Western Regional Climate Center 2010). The project area experiences an average winter temperature of approximately 56°F and an average summer temperature of approximately 71°F. Total precipitation in the project area averages approximately 14 inches annually. Precipitation occurs mostly during the winter and relatively infrequently during the summer. Precipitation averages approximately 8 inches during the winter, approximately 4 inches during the spring, approximately 2 inches during the fall, and less than 1 inch during the summer.

Existing Air Quality – Monitoring Data

SCAQMD monitors air quality conditions at 37 locations throughout the basin. I-405 borders SCAQMD's Inland Orange County and Coastal Air Monitoring Subregions. The most relevant monitoring station to the project area is the Costa Mesa Monitoring Station (Figure 3.2.6-2). Alternative air monitoring stations are located in Anaheim, Long Beach, and Lake Forest. These stations are farther from the project area than the Costa Mesa Monitoring Station and were determined not to as accurately represent existing air quality conditions. Historical data from the Costa Mesa Monitoring Station were used to characterize existing conditions in the vicinity of the project area.

Table 3.2.6-3 shows pollutant levels, the state and federal standards, and the number of exceedances recorded at the Costa Mesa Monitoring Station compared to the highest figures derived from the General Forecast Area from 2007 to 2009. Criteria pollutants CO, NO_2, and SO_2 did not exceed the CAAQS during the 2007 to 2009 period. The 1-hour state standard for O_3 was exceeded 4 to 5 times each year. The 24-hour state standard for PM_{10} was exceeded 3 to 5 days each year, and the annual state standard for $PM_{2.5}$ was also exceeded during the 2007 to 2009 period in the General Forecast Area.

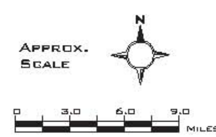
When compared to the General Forecast Area, the selected monitoring station recorded concentrations of $PM_{2.5}$, PM_{10}, O_3, and NO_2 that were lower than the General Forecast Area. CO was higher than the General Forecast Area in 2007, and SO_2 was comparable between the Costa Mesa location and the General Forecast Area.



LEGEND: Costa Mesa Monitoring Station

Air Monitoring Areas in Orange County:

16. North Orange County
17. Central Orange County
18. North Orange County Coastal
19. Saddleback Valley
20. Central Orange County Coastal
21. Capistrano Valley



SOURCE: South Coast Air Quality Management District Air Monitoring Areas, 1999.

Figure 3.2.6-2: Air Monitoring Locations

Table 3.2.6-3: 2007-2009 Ambient Air Quality Data in Project Vicinity

Pollutant	Pollutant Concentration and Standards	North Coastal Orange County Subregion[a]			General Forecast Area[b]		
		Number of Days above State Standard					
		2007	2008	2009[c]	2007	2008	2009
Ozone (O_3)	Maximum 1-hr Concentration (ppm)	0.08	0.09	0.09	0.12	0.11	-
	Days > 0.09 ppm (State 1-hr standard)	0	0	0	5	4	
	Days > 0.12 ppm (Federal 1-hr standard)	0	0	0	1	0	
Carbon Monoxide (CO)	Maximum 1-hr concentration (ppm)		3	n/a	4	3	-
	Days > 20 ppm (State1-hr standard)	0	0	n/a	0	0	
	Maximum 8-hr concentration (ppm)	3.1	2.0	2.2	2.7	2.2	-
	Days > 9.0 ppm (State 8-hr standard)	0	0	0	0	0	
Nitrogen Dioxide (NO_2)	Maximum 1-hr Concentration (ppm)	0.07	0.08	0.07	0.09	0.09	-
	Days > 0.18 ppm (State 1-hr standard)	0	0	0	0	0	
PM_{10}	Maximum 24-hr concentration (µg/m3)	74	42	62	75	52	-
	Days > 50 µg/m3 (State 24-hr standard)	3	0	1	5	3	
$PM_{2.5}$	Annual Arithmetic Mean (µg/m3)	11	10	12	13	12	-
	Exceed State Standard (12 µg/m3)	No	No	No	Yes	Yes	
Sulfur Dioxide (SO_2)	Maximum 24-hr Concentration (ppm)	<0.01	0.01	<0.01	<0.01	<0.01	-
	Days > 0.04 ppm (State 24-hr standard)	0	0	0	0	0	

[a] PM_{10} and $PM_{2.5}$ are not measured at North Coastal Orange County. Saddleback Valley data were used for PM_{10} and $PM_{2.5}$ measurements.
[b] The General Forecast Area includes Central Orange County, North Coastal Orange County, and Saddleback Valley air monitoring areas of the SCAQMD.
[c] 2009 data provided by CARB Air Quality Data Statistics. The Costa Mesa – Mesa Verde Drive air monitoring station data was used for each pollutant, except $PM_{2.5}$, and PM_{10}, which used the Anaheim – Pampas Lane air monitoring station.

Source: SCAQMD, Historical Data by Year, available at http://www.aqmd.gov/smog/historicaldata.htm, accessed November 21, 2010.

Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. CARB has identified the following typical groups who are most likely to be affected by air pollution: children under 14 years of age, the elderly over 65 years of age, athletes, and people with cardiovascular and chronic respiratory diseases. According to the SCAQMD, sensitive receptors include residences, schools, playgrounds, child-care centers, athletic facilities, long-term health-care facilities, rehabilitation centers, convalescent centers, and retirement homes. Figures 3.2.6-3 through 3.2.6-5 show sensitive receptors within 500 ft of the ROW. The map identifications correspond to the following receptors:

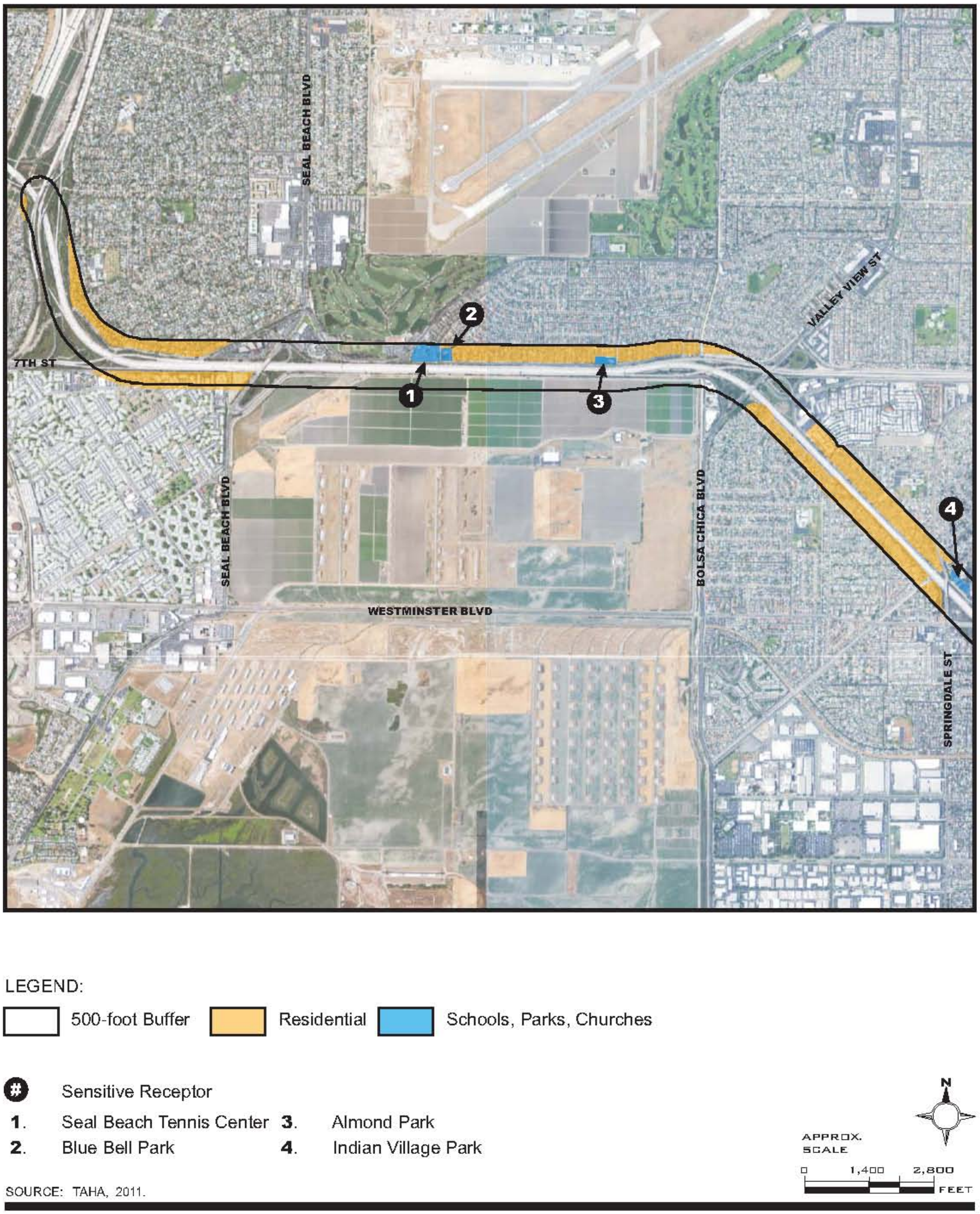


Figure 3.2.6-3: Sensitive Receptor Locations (Seal Beach Boulevard to Springdale Street)

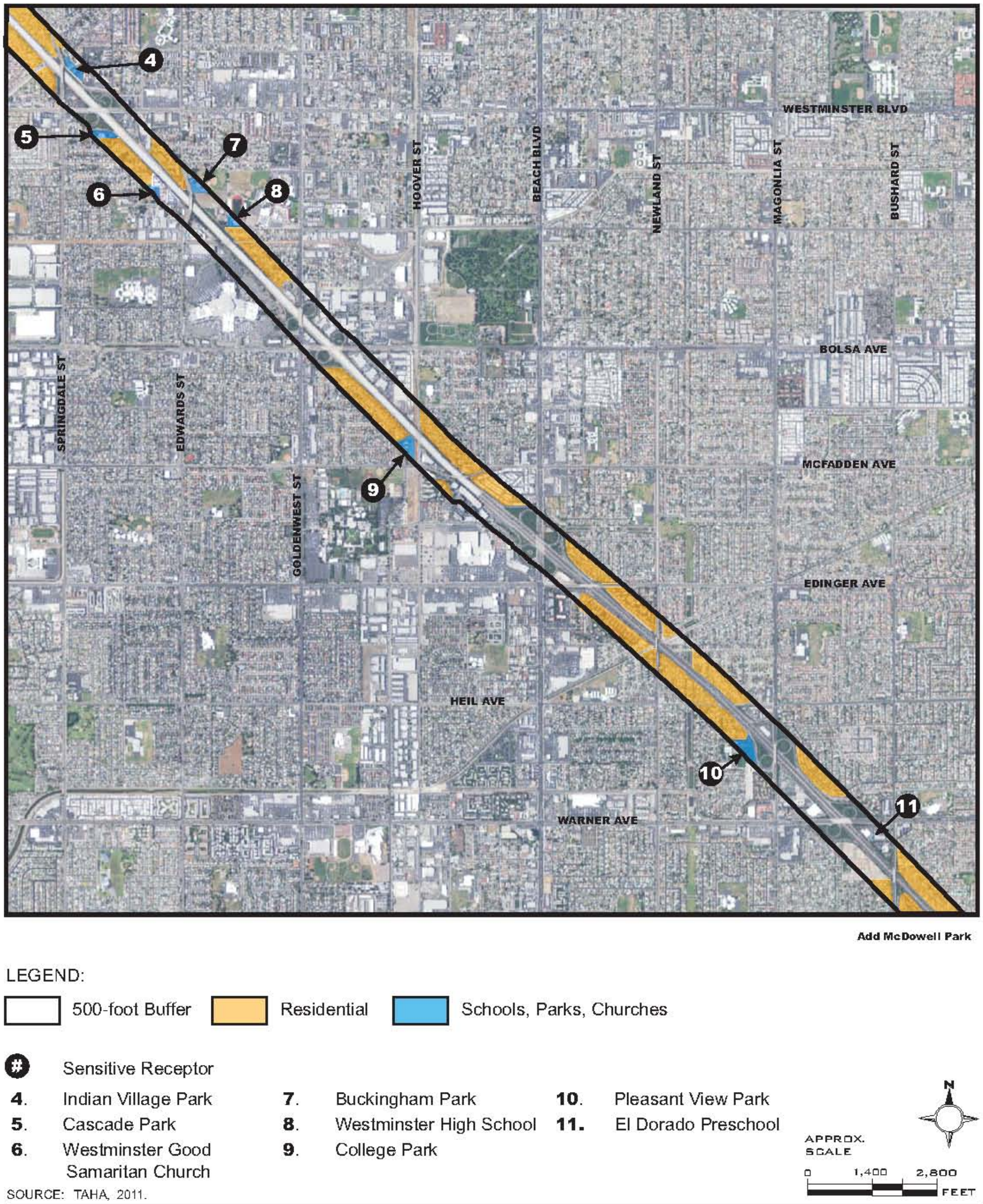


**Figure 3.2.6-4: Sensitive Receptor Locations
(Springdale Street to Warner Avenue)**

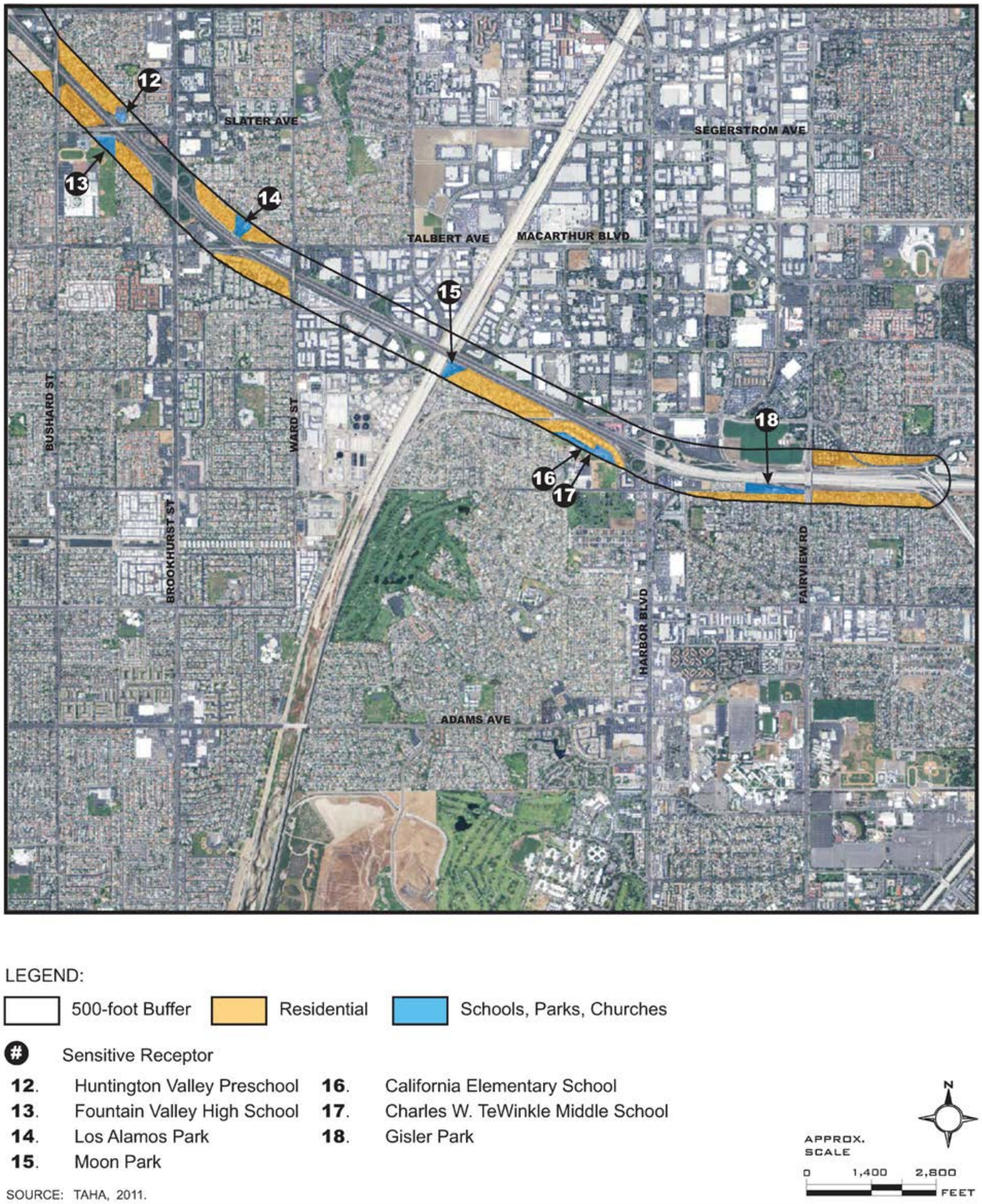


Figure 3.2.6-5: Sensitive Receptor Locations (Bushard Street to Fairview Road)

1. Seal Beach Tennis Center
2. Blue Bell Park
3. Almond Park (aka Shapell Park)
4. Indian Village Park
5. Cascade Park
6. Westminster Good Samaritan Church
7. Buckingham Park
8. Westminster High School
9. College Park
10. Pleasant View Park
11. El Dorado Preschool
12. Huntington Valley Preschool
13. Fountain Valley High School
14. Los Alamos Park
15. Moon Park
16. California Elementary School
17. Charles W. TeWinkle Middle School
18. Gisler Park

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

Potential health-related effects and symptoms related to exposure to pollutants of concern are provided below.

Carbon Monoxide

CO is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas such as the project location, automobile exhaust accounts for most of the CO emissions. CO is a nonreactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February.[15] The highest levels of CO typically occur during the colder months of the year when inversion conditions are more frequent. In terms of health, CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can be dizziness, fatigue, and impairment of central nervous system functions.

Ozone

O_3 is a colorless gas that is formed in the atmosphere when reactive organic gases (ROG), which include VOCs and nitrogen oxides (NO_X), react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of ROG and NO_X, which are the components of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O_3 formation. Ideal conditions occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. The greatest source of smog-producing gases is the automobile. Short-term exposure (i.e., lasting for a few hours) to O_3 at levels typically observed in southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

Nitrogen Dioxide

NO_2, like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_X and are major contributors to O_3 formation. NO_2 also contributes to the formation of

[15] Inversion is an atmospheric condition in which a layer of warm air traps cooler air near the surface of the earth, preventing the normal rising of surface air.

PM_{10}. High concentrations of NO_2 can result in a brownish-red cast to the atmosphere with reduced visibility and can cause breathing difficulties. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase of bronchitis in children (2 and 3 years old) has also been observed at concentrations below 0.3 parts per million (ppm).

Sulfur Dioxide

SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Main sources of SO_2 are coal and oil used in power plants and industries. Generally, the highest levels of SO_2 are found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

Particulate Matter

PM pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. PM also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of PM. Fine PM, or $PM_{2.5}$, is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as SO_2, NO_X, and VOC. Inhalable particulate matter, or PM_{10}, is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as Pb, sulfates, and nitrates can cause lung damage directly. These substances can be absorbed into the blood stream and cause damage elsewhere in the body. These substances can transport absorbed gases, such as chlorides or ammonium, into the lungs and cause injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues.

Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

Lead

Pb in the atmosphere occurs as PM. Sources of lead include leaded gasoline; the manufacturers of batteries, paint, ink, ceramics, and ammunition; and secondary Pb smelters. Prior to 1978, mobile emissions were the primary source of atmospheric Pb. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne Pb by nearly 95 percent. With the phase-out of leaded gasoline, secondary Pb smelters, battery recycling, and manufacturing facilities have become Pb-emission sources of greater concern.

Prolonged exposure to atmospheric Pb poses a serious threat to human health. Health effects associated with exposure to Pb include gastrointestinal disturbances, anemia, kidney disease, and, in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level Pb exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth.

Toxic Air Contaminants

A substance is considered toxic if it has the potential to cause adverse health effects in humans. A toxic substance released into the air is considered a TAC. TACs are identified by state[16] and federal agencies based on a review of available scientific evidence. In the State of California, TACs are identified through a two-step process that was established in 1983 under the Toxic Air Contaminant Identification and Control Act. This two-step process of risk identification and risk management was designed to protect residents from the health effects of toxic substances in the air.

Naturally Occurring Asbestos

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

3.2.6.3 Environmental Consequences

This section examines the degree to which the project alternatives may cause significant adverse changes to air quality. Short-term construction emissions occurring from activities, such as

[16] California Health and Safety Code §39657

grading and haul truck trips, and long-term effects related to the ongoing operation of the alternatives are discussed in this section. This analysis focuses on air pollution from two perspectives: daily emissions and pollutant concentrations. “Emissions” refer to the quantity of pollutants released into the air, measured in pounds per day (ppd). “Concentrations” refer to the amount of pollutant material per volumetric unit of air, measured in ppm or micrograms per cubic meter ($\mu g/m^3$).

Consistency with Applicable Plans/Conformity Determination

Nonattainment/maintenance areas are subject to the Transportation Conformity Rule, which requires local transportation and air quality officials to coordinate planning to ensure that transportation projects, such as road construction, do not affect an area’s ability to reach its clean air goals. Transportation conformity requirements become effective 1-year after an area is designated as nonattainment.

The federal Clean Air Act Amendments (CAAAs) of 1990 require that transportation plans, program, and projects that are funded by or approved under Title 23 of the U.S.C. or the Federal Transit Act conform to state or federal air quality plans. To be in conformance, a project must come from approved transportation plans and programs such as the SIP, RTP, and the FTIP[17]. Southern California Association of Governments (SCAG), as the federally recognized MPO and the designated regional transportation planning agency, is responsible for preparing the RTP and FTIP. As part of its regional planning responsibilities, SCAG prepared the demographic projections and integrated land use, housing, employment, and transportation programs, measures, and strategies portions of the AQMP. These projections are used for determining conformity to the AQMP for proposed federal projects, plans, and programs. As shown in Table 3.2.6-2, the SCAB is in attainment for CO, NO_2, and SO_2 for both state and federal standards and a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$ under both state and federal standards; therefore, a hot-spot analysis is required in nonattainment and maintenance areas for CO, PM_{10}, and $PM_{2.5}$.

The proposed project descriptions were updated in the 2012 Regional Transportation Plan (RTP) and 2015 Federal Transportation Improvement Program (FTIP) as listed below:

- 2012 RTP: (ORA030605) “Add 1 MF lane in each direction, and additional capital improvements (by 2022); convert existing HOV to HOT, add 1 additional HOT lane each direction (by 2035)”

[17] The FTIP is a capital listing of all transportation projects proposed over a 6-year period for the SCAG region.

- 2015 FTIP: (ORA030605) "I-405 FROM SR-73 TO I-605. Add 1 MF lane in each direction, and additional capital improvements. Combined with ORA045, ORA151, ORA100507 and ORA120310."
- 2015 FTIP: (ORA030605A) "I-405 from SR-73 to I-605. Convert existing HOV to HOT. Add 1 additional HOT lane each direction (by 2035)."

The project's design concept and scope have not changed significantly from what was analyzed in the regional conformity analysis. This analysis found that the plan, which takes into account regionally significant projects and financial constraint, will conform to the SIPs for attaining and/or maintaining the NAAQS as provided in Section 176(c) of the FCAA.

Transportation Conformity Working Group Coordination

The Transportation Conformity Working Group (TCWG) is a forum to support interagency coordination to help improve air quality and maintain transportation conformity in southern California. The group meets on a monthly basis to facilitate an inclusive air quality planning process and to fulfill the interagency consultation requirements of the Federal Transportation Conformity Rule. The group helps resolve regional issues pertaining to transportation conformity and coordinates with and supports the quarterly meetings of the Statewide TCWG. Membership of the Southern California TCWG includes federal (i.e., EPA, EPA Region 9, FHWA, FTA), state (i.e., CARB, Caltrans), regional (e.g., Air Quality Management Districts, SCAG), and subregional (i.e., County Transportation Commissions) agencies and other stakeholders.

The proposed project was presented before the TCWG on January 25, 2011. The TCWG determined that the proposed project is a project of air quality concern (POAQC) and a qualitative PM hot-spot analysis is required (see Appendix J). The PM hot-spot analysis was prepared in accordance with 40 CFR 93.116 and 93.123, and EPA's hot-spot guidance. The hot-spot analysis, as described under Permanent Impact Methodology and Analysis, shows that the proposed project would not cause or contribute to, or worsen, any new localized violation of PM_{10} and/or $PM_{2.5}$ standards. The TCWG concurred with the analysis on October 28, 2014. An Air Quality Conformity Analysis (January 2015) was prepared and submitted to FHWA. FHWA issued a project-level conformity determination on February 9, 2015 (see Appendix J).

Permanent Impacts (Methodology and Analysis)

EMFAC2011 was used to calculate operational emissions, based on the traffic analysis developed for this project. The truck percentage is 3.5%, 3.5%, and 3.0% for the segments of SR-73 to Brookhurst, Brookhurst to SR-22 East, and SR-22 East to I-605, respectively. The VMT weighted average speeds for the 2020 No Build and Build Alternative 3 are 37 and 57 miles per hour, respectively. The average speeds for the 2020 Build Alternative 1 and 2 are 50 and 57 miles per hour, respectively. The average speeds for the 2040 Build Alternative 1 and 2 are 34 and 45 miles per hour, respectively. EMFAC2011 is the latest emission inventory model for motor vehicles operating on roads in California. This model reflects CARB's current understanding of how vehicles travel and how much they pollute. The EMFAC2011 model can be used to show how California motor vehicle emissions have changed over time and are projected to change in the future. The emission rates provided by EMFAC2011 in grams per mile were used in conjunction with traffic volumes and speeds to calculate daily emissions for existing conditions.

The vehicle miles traveled (VMT) for each alternative by segment and lane type are presented in Table 3.2.6-4. The average daily traffic (ADT) and VMT for each alternative are presented in Table 3.2.6-5. The traffic volumes and speeds were split into northbound and southbound lanes for three I-405 segments: SR-73 to Brookhurst Street, Brookhurst Street to SR-22 East, and SR-22 East to I-605. The data were also split based on GP and HOV lanes. This process was repeated for both opening year 2020 and horizon year 2040. All of these variables were considered in the estimation of regional air pollutant emissions.

Table 3.2.6-4: Vehicle Miles Traveled by Segment

Scenario	Automobile VMT					
	Northbound			Southbound		
	GP	HOV	Truck	GP	HOV	Truck
2009 Existing						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	87,143	8,273	2,695	103,376	10,002	3,197
Brookhurst to SR-22 East	151,136	30,190	5,482	133,922	26,073	4,857
SR-22 East to I-605	111,662	14,258	4,050	106,867	11,221	3,876
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	114,985	19,716	3,556	107,861	15,075	3,336
Brookhurst to SR-22 East	205,248	44,380	7,444	192,580	42,017	6,985
SR-22 East to I-605	139,592	20,454	5,063	153,265	20,083	5,559
Non-Peak Periods						
SR-73 to Brookhurst	225,501	10,341	6,974	275,091	3,746	8,508
Brookhurst to SR-22 East	422,758	40,731	15,333	469,274	26,157	17,020
SR-22 East to I-605	262,794	8,718	9,531	346,669	4,458	12,573
2020 No Build Alternative						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	149,071	19,035	5,407	164,949	23,022	5,983

Table 3.2.6-4: Vehicle Miles Traveled by Segment

Scenario	Automobile VMT					
	Northbound			Southbound		
	GP	HOV	Truck	GP	HOV	Truck
Brookhurst to SR-22 East	240,943	46,146	8,739	213,937	44,475	7,759
SR-22 East to I-605	163,722	37,183	5,938	145,491	35,992	5,277
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	223,844	28,336	8,119	201,597	25,836	7,312
Brookhurst to SR-22 East	347,838	66,043	12,616	306,457	58,906	11,115
SR-22 East to I-605	221,904	49,954	8,048	216,136	49,210	7,839
Non-Peak Periods						
SR-73 to Brookhurst	195,662	9,503	7,097	194,265	3,308	7,046
Brookhurst to SR-22 East	304,609	45,533	11,048	297,993	42,463	10,808
SR-22 East to I-605	180,297	52,084	6,539	213,329	41,112	7,737
2020 Alternative 1						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	143,284	18,773	4,431	166,002	23,056	5,134
Brookhurst to SR-22 East	244,444	38,632	8,866	223,822	38,359	8,118
SR-22 East to I-605	161,941	34,335	5,874	149,384	33,923	5,418
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	215,877	27,974	6,677	193,498	25,471	5,984
Brookhurst to SR-22 East	354,082	55,341	12,842	310,474	49,295	11,261
SR-22 East to I-605	220,226	46,173	7,987	213,456	45,440	7,742
Non-Peak Periods						
SR-73 to Brookhurst	213,283	10,218	6,596	205,123	3,723	6,344
Brookhurst to SR-22 East	348,453	30,088	12,638	333,230	27,337	12,086
SR-22 East to I-605	205,826	45,704	7,465	231,969	36,193	8,413
2020 Alternative 2						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	136,702	18,511	4,228	176,306	23,524	5,453
Brookhurst to SR-22 East	244,230	33,245	8,858	250,192	33,561	9,074
SR-22 East to I-605	160,730	30,656	5,830	165,430	31,107	6,000
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	206,719	27,610	6,393	184,324	25,104	5,701
Brookhurst to SR-22 East	355,076	47,670	12,878	309,725	42,400	11,234
SR-22 East to I-605	219,384	41,267	7,957	211,532	40,552	7,672
Non-Peak Periods						
SR-73 to Brookhurst	229,941	10,935	7,112	204,900	3,705	6,337
Brookhurst to SR-22 East	392,309	18,766	14,229	348,530	16,690	12,641

Table 3.2.6-4: Vehicle Miles Traveled by Segment

Scenario	Automobile VMT					
	Northbound			Southbound		
	GP	HOV	Truck	GP	HOV	Truck
SR-22 East to I-605	241,719	29,090	8,767	241,731	28,962	8,767
2020 Alternative 3						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	137,501	27,893	4,987	170,413	30,781	6,181
Brookhurst to SR-22 East	242,529	52,928	8,796	223,937	58,807	8,122
SR-22 East to I-605	173,528	31,272	6,294	166,134	31,272	6,026
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	191,016	41,232	6,928	191,647	37,366	6,951
Brookhurst to SR-22 East	319,773	78,777	11,598	304,227	77,463	11,034
SR-22 East to I-605	217,351	41,892	7,883	234,578	41,892	8,508
Non-Peak Periods						
SR-73 to Brookhurst	225,614	15,486	8,183	187,983	7,107	6,818
Brookhurst to SR-22 East	377,908	28,750	13,707	322,233	25,807	11,687
SR-22 East to I-605	238,522	14,061	8,651	225,357	13,950	8,174
2040 No Build Alternative						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	171,851	21,285	6,233	229,897	28,066	8,338
Brookhurst to SR-22 East	277,898	51,636	10,079	299,932	54,923	10,878
SR-22 East to I-605	189,230	42,381	6,863	202,168	44,830	7,333
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	265,592	32,594	9,633	232,234	28,878	8,423
Brookhurst to SR-22 East	396,392	72,972	14,377	344,315	64,217	12,488
SR-22 East to I-605	259,476	57,631	9,411	244,780	54,861	8,878
Non-Peak Periods						
SR-73 to Brookhurst	202,931	9,954	7,360	159,922	1,318	5,800
Brookhurst to SR-22 East	298,919	47,402	10,842	247,617	40,892	8,981
SR-22 East to I-605	181,042	58,197	6,566	181,933	41,740	6,599
2040 Alternative 1						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	164,643	20,970	5,092	219,566	27,615	6,791
Brookhurst to SR-22 East	283,745	43,595	10,291	305,277	46,315	11,072
SR-22 East to I-605	188,043	39,098	6,820	200,378	41,237	7,268

Table 3.2.6-4: Vehicle Miles Traveled by Segment

Scenario	Automobile VMT					
	Northbound			Southbound		
	GP	HOV	Truck	GP	HOV	Truck
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	255,397	32,148	7,899	222,147	28,438	6,871
Brookhurst to SR-22 East	406,227	61,676	14,734	351,010	54,200	12,731
SR-22 East to I-605	258,836	53,211	9,388	242,775	50,646	8,805
Non-Peak Periods						
SR-73 to Brookhurst	225,196	10,868	6,965	185,062	2,349	5,724
Brookhurst to SR-22 East	352,420	31,476	12,782	299,052	27,210	10,846
SR-22 East to I-605	213,267	50,983	7,735	212,980	37,525	7,725
2040 Alternative 2						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	156,503	18,576	4,840	209,627	24,302	6,483
Brookhurst to SR-22 East	285,048	34,010	10,339	308,021	35,894	11,172
SR-22 East to I-605	187,030	31,568	6,783	200,176	33,085	7,260
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	243,768	31,699	7,539	210,800	27,996	6,520
Brookhurst to SR-22 East	409,773	53,562	14,862	352,008	46,990	12,767
SR-22 East to I-605	258,498	47,823	9,376	241,047	45,438	8,743
Non-Peak Periods						
SR-73 to Brookhurst	246,509	13,865	7,624	207,848	6,243	6,428
Brookhurst to SR-22 East	407,582	23,431	14,783	350,361	21,249	12,707
SR-22 East to I-605	253,338	40,356	9,188	245,762	35,135	8,914
2040 Alternative 3						
Morning Peak Period (6:00 AM - 9:00 AM)						
SR-73 to Brookhurst	165,010	27,893	5,985	211,440	30,781	7,669
Brookhurst to SR-22 East	296,915	52,928	10,769	292,455	58,807	10,607
SR-22 East to I-605	209,035	31,272	7,582	208,167	31,272	7,550
Evening Peak Period (3:00 PM - 7:00 PM)						
SR-73 to Brookhurst	235,797	41,232	8,552	230,175	37,366	8,348
Brookhurst to SR-22 East	383,718	78,777	13,917	363,555	77,463	13,186
SR-22 East to I-605	263,678	41,892	9,563	276,387	41,892	10,024
Non-Peak Periods						
SR-73 to Brookhurst	237,612	18,062	8,618	182,261	8,057	6,610
Brookhurst to SR-22 East	382,755	32,930	13,882	309,441	29,190	11,223
SR-22 East to I-605	245,494	16,462	8,904	216,968	15,829	7,869

Source: Parsons 2014.

Table 3.2.6-5: Average Daily Traffic and Vehicle Miles Traveled

Scenario	ADT	VMT
2009 Existing Conditions	936,000	4,092,000
2020 No Build	1,111,600	4,805,000
2020 Alternative 1	1,124,200	4,868,000
2020 Alternative 2	1,136,800	4,932,000
2020 Alternative 3	1,141,600	4,958,000
2040 No Build	1,230,000	5,299,000
2040 Alternative 1	1,251,000	5,405,000
2040 Alternative 2	1,272,000	5,511,000
2040 Alternative 3	1,280,000	5,554,000

Source: Parsons 2014.

Regional Analysis

Existing Emissions

Existing emissions in the project corridor were estimated using EMFAC2011 emission factors. They are presented in Table 3.2.6-6 for comparison to the No Build and Build Alternatives.

Table 3.2.6-6: Estimated 2009 Daily Operational Emissions

Emission Source	Pounds per Day					
	VOC	NO_X	CO	SO_X	$PM_{2.5}$	PM_{10}
Existing Conditions	1,179	5,756	28,880	42	288	617

Source: Terry A. Hayes Associates Inc, 2014.

No Build Alternative

The conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Congestion within the project corridor would continue to increase and contribute to decreased air quality within the project corridor and region, as shown for the 2020 and 2040 No Build Alternatives in Tables 3.2.6-7 and 3.2.6-8.

Table 3.2.6-7: Estimated 2020 Daily Operational Emissions

Emission Source	Pounds per Day					
	VOC	NO_X	CO	SO_X	$PM_{2.5}$	PM_{10}
No Build Alternative	674	2,990	14,730	49	280	660
Alternative 1 (% Change from 2020 No Build Alternative)	388 (42%)	2,495 (17%)	11,626 (21%)	50 (1%)	263 (6%)	646 (2%)
Net Change from No Build Alternative to Alternative 1	(286)	(495)	(3,105)	1	(17)	(14)
Alternative 2 (% Change from 2020 No Build Alternative)	392 (42%)	2,593 (13%)	11,147 (24%)	50 (3%)	268 (4%)	657 (0.5%)
Net Change from No Build Alternative to Alternative 2	(282)	(397)	(3,583)	1	(12)	(3)
Alternative 3 (% Change from 2020 No Build Alternative)	392 (42%)	2,600 (13%)	11,190 (24%)	51 (3%)	268 (4%)	659 (0.1%)
Net Change from No Build Alternative to Alternative 3	(282)	(390)	(3,540)	1	(12)	(0.5)

Source: Terry A. Hayes Associates Inc, 2014.

Table 3.2.6-8: Estimated 2040 Daily Operational Emissions

Emission Source	Pounds per Day					
	VOC	NO_X	CO	SO_X	$PM_{2.5}$	PM_{10}
No Build Alternative	1,070	2,553	13,417	55	364	789
Alternative 1 (% Change from 2040 No Build Alternative)	571 (46.6%)	1,932 (24.3%)	10,934 (18.5%)	57 (2%)	320 (12%)	749 (5%)
Net Change from No Build Alternative to Alternative 1	(499)	(621)	(2,483)	1	(44)	(40)
Alternative 2 (% Change from 2040 No Build Alternative)	397 (63%)	1,674 (34%)	9,399 (30%)	57 (4%)	307 (16%)	743 (6%)
Net Change from No Build Alternative to Alternative 2	(673)	(879)	(4,018)	2	(58)	(46)
Alternative 3 (% Change from 2040 No Build Alternative)	393 (63%)	1,711 (33%)	9,449 (30%)	57 (5%)	308 (15%)	749 (5%)
Net Change from No Build Alternative to Alternative 3	(677)	(842)	(3,968)	2	(56)	(40)

Source: Terry A. Hayes Associates Inc, 2014.

Alternative 1

A consistency analysis determination plays an essential role in local agency project review by linking local planning and unique individual projects to the AQMP in the following ways: it fulfills the CEQA goal of fully informing local agency decision makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are fully addressed, and it provides the local agency with ongoing information, assuring local decision makers that they are making real contributions to clean air goals defined in the most current AQMP (adopted 2012). Because the AQMP is based on projections from local General Plans, projects that are consistent with the local General Plan are generally considered consistent with the AQMP. Implementation of the proposed project would also not delay timely implementation of the TCMs identified in the AQMP. The proposed project would not significantly contribute to or cause deterioration of existing air quality; therefore, mitigation measures are not required for the long-term operation of the proposed project.A regional emissions analysis was also completed based on VMT and vehicle speeds. Regional criteria pollutant and VOC emissions are presented in Tables 3.2.6-5 through 3.2.6-7. Differences in build alternatives' anticipated 2020 and 2040 operational emission is minimal. Tables 3.2.6-6 and 3.2.6-7 show emissions for the build alternatives are generally less than the existing and future no build conditions. This decrease is due to higher vehicle speeds, which generally result in lower emission rates. Alternative 2 emissions would generally be less than existing and future no build emissions, and they would generally be slightly less than Alternative 1 emissions (i.e., no greater than 3 percent). Alternative 3 emissions would be less than existing and future no build emissions, and they would generally be less than Alternative 1 emissions (i.e., no greater than 4 percent). Therefore, build alternatives would result in a beneficial effect related to regional operational emissions.

On September 11, 2014, the SCAG Regional Council approved Amendment #2 to the 2012-2035 RTP/SCS after a 30-day public review and comment period. Amendment #2 was developed as a response to changes to projects in the 2012-2035 RTP/SCS. Alternative 1 is included in Amendment #2 and, as such, is the current project-related alternative in the 2012-2035 RTP/SCS. The project is described as "Add 1 MF lane in each direction on I-405 and provide additional capital improvements. #317. Combined with ORA045, ORA151, and ORA120310" (RTP/FTIP ID ORA030605).

A consistency analysis determination plays an essential role in local agency project review by linking local planning and unique individual projects to the AQMP in the following ways: it fulfills the CEQA goal of fully informing local agency decision makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are fully addressed, and it provides the local agency with ongoing information, assuring local decision makers that they are making real contributions to clean air goals defined in the most current AQMP (adopted 2012). Because the AQMP is based on projections from local General Plans, projects that are consistent with the local General Plan are generally considered consistent with the AQMP. Implementation of the proposed project would also not delay timely implementation of the TCMs identified in the AQMP. The proposed project would not significantly contribute to or cause deterioration of existing air quality; therefore, mitigation measures are not required for the long-term operation of the proposed project.

A regional emissions analysis was also completed based on VMT and vehicle speeds. Regional criteria pollutant and VOC emissions are presented in Tables 3.2.6-6 through 3.2.6-8. Alternative 1 emissions would be less than existing and future no build emissions. This decrease is due to higher vehicle speeds under Alternative 1, which generally result in lower emission rates. Therefore, Alternative 1 would result in a beneficial effect related to regional operational emissions.

Alternative 2

The design concept of Alternative 2 includes the addition of two GP lanes in each direction. The design concept and scope for Alternative 2 is substantially different from what was analyzed in the 2012-2035 RTP/SCS. If it becomes the preferred alternative, Alternative 2 will require an amendment to the project description in the RTP and may need to be remodeled, as required by SCAG. The year that the project is anticipated to open to the public is consistent with (i.e., within the same regional emission analysis period as) the construction completion date identified in the FTIP and/or RTP. Alternative 2 will have to go through the SCAG RTP and FTIP amendment process prior to being able to determine consistency with the plans.

A regional emissions analysis was also completed based on VMT and vehicle speeds. Regional criteria pollutant and VOC emissions are presented in Tables 3.2.6-6 through 3.2.6-8. Alternative 2 emissions would be less than existing and future no build emissions. This decrease is due to higher vehicle speeds under Alternative 2, which generally result in lower emission rates. Therefore, Alternative 2 would result in a beneficial effect related to regional operational emissions.

Alternative 3 (Preferred Alternative)

The design concept of Alternative 3 includes one GP lane in each direction on I-405 from Euclid Street to the I-605 interchange, plus add a tolled Express Lane in each direction of I-405 from SR-73 to SR-22 East. The tolled Express Lane and the existing HOV lanes would be managed jointly as a tolled Express Facility with two lanes in each direction from SR-73 to I-605. The design concept and scope for Alternative 3 is substantially different from what was analyzed in Amendment #2 of the 2012-2035 RTP/SCS, which was Alternative 1.

The proposed project descriptions were updated in the 2012 Regional Transportation Plan (RTP) and 2015 Federal Transportation Improvement Program (FTIP) as listed below:

- 2012 RTP: (ORA030605) "Add 1 MF lane in each direction, and additional capital improvements (by 2022); convert existing HOV to HOT, add 1 additional HOT lane each direction (by 2035)"
- 2015 FTIP: (ORA030605) "I-405 FROM SR-73 TO I-605. Add 1 MF lane in each direction, and additional capital improvements. Combined with ORA045, ORA151, ORA100507 and ORA120310."
- 2015 FTIP: (ORA030605A) "I-405 from SR-73 to I-605. Convert existing HOV to HOT. Add 1 additional HOT lane each direction (by 2035)."

The design concept and scope of the proposed project is consistent with the currently approved FTIP.

A regional emissions analysis was also completed based on VMT and vehicle speeds. Regional criteria pollutant and VOC emissions are presented in Tables 3.2.6-6 through 3.2.6-8. Alternative 3 emissions would be less than existing and future no build emissions. This decrease is due to higher vehicle speeds under Alternative 3, which generally result in lower emission rates. Therefore, Alternative 3 would result in a beneficial effect related to regional operational emissions.

Health Risks for all Build Alternatives

In 2020, based on the methodology provided by FHWA, the various build alternatives would generate between 8 and 72 percent less MSAT emissions than existing conditions and the No Build Alternative, as shown in Tables 3.2.6-13 and 3.2.6-14 of this Final EIR/EIS. In 2040, the various build alternatives would generate between 19 and 82 percent less MSAT emissions than existing conditions and the No Build Alternative.

The primary pollutant of concern for health risk is diesel particulate matter (DPM). When compared to existing conditions and the No Build Alternative, the various build alternatives would reduce DPM emissions in the study area between 8 and 17 percent in 2020 and between 19 and 27 percent in 2040; therefore, each of the build alternatives would reduce long-term health risks along the project segments.

Health effects of diesel vehicles and equipment are evaluated over a 70-year period. No phase of construction activity would last more than 5 years. In addition, onsite equipment would not be located in the vicinity of any one location for the entire duration of a phase; therefore, the short term exposure to construction activities would not result in long-term health risks

As can be seen that for both 2020 and 2040, the identified alternative's MSAT emissions will be dramatically lower than existing as well as No Build conditions and this would cause an overall betterment in MSAT emissions rates. Therefore a health risk assessment is not warranted for HAP/MSAT/TAC emissions.

Temporary Impacts (Methodology and Analysis)

The temporary impact analysis described below utilizes the Sacramento Metropolitan Air Quality Management District's RoadMod Version 7.1.5.1, published December 2013 to quantify emissions associated with roadway construction. RoadMod is a data-entry spreadsheet that utilizes various sources to estimate construction emissions, including OFFROAD2011 and EMFAC2011. Assumptions used for the construction calculations are as follows:

- Year 2016 start date
- 16-mile corridor length
- 250-ft corridor width
- 54-month construction period
- A maximum of 4.5 acres of land disturbed per day
- A maximum of 622 cubic yards per day of soil to be imported
- A maximum of 604 cubic yards per day of soil to be exported

No Build Alternative

The No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor; therefore, the No Build Alternative would not result in an adverse impact related to construction emissions.

Alternative 1

During construction (48 months), short-term degradation of air quality may occur due to the release of particulate emissions (i.e., airborne dust) generated by excavation, grading, hauling, and various other activities related to construction. Emissions from construction equipment also are anticipated and would include CO, NO_X, VOCs, directly emitted PM (i.e., PM_{10} and $PM_{2.5}$), and TACs such as diesel exhaust PM. O_3 is a regional pollutant that is derived from NO_X and VOCs in the presence of sunlight and heat.

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM_{10}, $PM_{2.5}$, and small amounts of CO, SO_2, NO_X, and VOCs. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Construction activities for large development projects are estimated by EPA to add 1.09 tonne (1.2 tons) of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, the emissions can be reduced by up to 50 percent.[18] Caltrans' Standard Specifications (Section 10) pertaining to dust minimization requirements requires the use of water or dust palliative compounds and would reduce potential fugitive dust emissions during construction.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_X, VOCs and some soot particulate (i.e., PM_{10} and $PM_{2.5}$) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

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

[18] SCAQMD indicates that Rule 403 can reduce fugitive dust emissions up to 61 percent.

minimal. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of each paving sites. Such odors would be quickly dispersed below detectable thresholds as distance from the site increases.

Construction of the proposed project is anticipated to range between 48 months (Alternative 1) to 54 months (Alternative 3). As a result, project construction would not last more than 5 years and is considered temporary. Stationary or mobile-powered onsite construction equipment would include trucks, tractors, signal boards, excavators, backhoes, concrete saws, crushing and/or processing equipment, graders, trenchers, pavers, and other paving equipment.

Table 3.2.6-9 shows the estimated daily emissions associated with each construction phase. The emissions were estimated using RoadMod and the assumptions listed in the methodology discussion. Limited detailed construction information was available at the time of this analysis; therefore, the analysis mostly relies on RoadMod default assumptions, including the fleet mix. The override option was used to eliminate signal boards from the fleet mix because signal boards are typically solar powered and do not generate air emissions. The construction schedule indicates that overlapping activities would occur throughout the project corridor. Without detailed information available, this conservative analysis assumed that each of the construction phases presented in Table 3.2.6-9 could occur simultaneously throughout the corridor. Construction emissions would be temporary and not result in any long-term impacts; therefore, Alternative 1 would not result in an adverse impact related to construction emissions.

Table 3.2.6-9: Estimated Daily Construction Emissions

Construction Phase	Pounds per Day				
	VOC	NO_X	CO	$PM_{2.5}$	PM_{10}
Grubbing/Land Clearing	2	21	18	10	46
Grading/Excavation	11	140	60	15	51
Drainage/Utilities	5	46	33	12	48
Paving	2	18	19	1	1
Potential Overlapping Emissions	20	225	130	38	146

Source: Terry A. Hayes Associates Inc, 2014.

Alternative 2

Alternative 2 would include construction of an additional travel lane in each direction compared to Alternative 1. This would result in a longer construction period (51 months versus 48 months) and more total emissions compared to Alternative 1; however, Alternative 2 daily construction intensity (e.g., equipment hours) would likely be slightly less than assumed for Alternative 1.

Table 3.2.6-9 is representative of daily emissions associated with Alternative 2. Construction emissions would be temporary and not result in any long-term impacts; therefore, Alternative 2 would not result in an adverse impact related to construction emissions.

Alternative 3 (Preferred Alternative)

Similar to Alternative 2, Alternative 3 would include construction of two travel lanes in each direction. This could result in a longer construction period (54 months versus 48 months) and more total emissions compared to Alternative 1 but slightly less than Alternative 2. Table 3.2.6-9 is also representative of daily emissions associated with Alternative 3. Construction emissions would be temporary and not result in any long-term impacts; therefore, Alternative 3 would not result in an adverse impact related to construction emissions.

Local Project-Level Analysis

CO Hot-Spot Analysis related to Transportation Conformity

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

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

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

Alternative 1

The scope required for CO local analysis is summarized in the CO Protocol, Section 3 (Determination of Project Requirements). Below is a step-by-step explanation of the flowchart (see Appendix E-2 of the Air Quality Report for CO Protocol Parts 1 & 2 completed for this project). Each level cited is followed by a response, which would determine the next applicable level of the flowchart for the project. The flowchart begins with Section 3.1.1:

- 3.1.1. Is this project exempt from all emissions analyses? No. Table 1 of the CO Protocol is Table 2 of §93.126. The proposed project does not appear in Table 1. It is not exempt from all emissions analyses.
- 3.1.2. Is this project exempt from regional emissions analyses? No. Table 2 of the CO Protocol lists projects that are exempt from regional emissions analysis. The table does not include additional GP or express freeway lanes. It is not exempt from regional emissions analyses.
- 3.1.3. Is the project locally defined as regionally significant? Yes. The proposed project is considered regionally significant because it is included in the 2012-2035 RTP/SCS.
- 3.1.4. Is the project in a federal attainment area? No. The proposed project is within the SCAB, which has been designated as an attainment/maintenance area for the federal CO standards effective June 11, 2007.
- 3.1.5. Is there a currently conforming RTP and TIP? Yes. The proposed project is located in the SCAG region, which has a currently conforming RTP and TIP. FHWA determined the RTP to conform to the SIP on December 13, 2012. FHWA determined the TIP to conform to the SIP on June 4, 2012.
- 3.1.6. Is the project included in the regional emissions analysis supporting the currently conforming RTP and TIP? Yes. The proposed project is included in the regional emissions analysis conducted by SCAG for the conforming 2012-2035 RTP/SCS; therefore, the individual projects contained in the plan are conforming projects and will have air quality impacts consistent with those identified in the SIP.
- 3.1.7. Has the project design concept and/or scope changed significantly from that in the regional analysis? No. The project design concept refers to the type of facility identified by the proposed project. The project design scope refers to the design aspects that affect the proposed facility's impact on emissions, usually as they relate to carrying capacity and control. The design concept and scope of the proposed project is consistent with the project description in the 2012-2035 RTP/SCS, the 2013 TIP, and the assumptions in SCAG's regional emissions analysis.
- 3.1.9. Examine local impacts. Section 3.1.9 of the flowchart directs the project evaluation to Section 4 (Local Analysis) of the CO Protocol.

The CO Protocol Section 4 flowchart determines the type of CO analysis required for the proposed project. Section 4 begins at Level 1 and is described below (see Appendix E-2 of the Air Quality Report for the Local CO Analysis Parts 1 and 2 completed for this project).

- Level 1a. Is the project in a CO nonattainment area? No. As stated in 3.1.4, the proposed project is within the SCAB, which has been designated as an attainment/maintenance area for the federal CO standards effective June 11, 2007.
- Level 1b. Was the area redesignated as "attainment" after the 1990 FCAA? Yes. The proposed project is located in the SCAB, under jurisdiction of the SCAQMD, and was classified nonattainment after the 1990 FCAA. The SCAB has been granted federal redesignation to attainment/maintenance effective June 11, 2007.
- Level 1c. Has "continued attainment" been verified with local Air District, if appropriate? Yes. As stated above, the SCAB was recently redesignated as an attainment/maintenance area for the federal CO standards effective June 11, 2007. Additionally, Table 3.2.6-3 shows that the Costa Mesa Monitoring Station has not recorded an exceedance for CO in the past 3 years.
- Level 7a. Does the project worsen air quality? Yes. Although the basin is designated as an attainment/maintenance area for CO, it is necessary to determine project contributions to local air quality. Intersections where air quality may be getting worse are of primary concern. Section 4.7.1 of the CO Protocol provides criteria to determine whether a project is likely to worsen air quality. These criteria include increases in vehicles operating in cold-start mode, increases in traffic volumes greater than 5 percent, and a worsening of traffic flow. Alternative 1 would increase traffic volumes by more than 5 percent when compared to both existing and future project conditions.
- Level 7b. Is the project suspected of resulting in higher CO concentrations than those existing within the region at the time of attainment demonstration? Yes. Intersection reconfigurations may move the roadway closer to receptors and may increase peak-hour traffic volumes. This may result in higher CO concentrations near reconfigured intersections.
- Level 7c. Does the project involve a signalized intersection at LOS E or F? Yes**.** As shown in Appendix H of the Air Quality Report, numerous intersections will operate at LOS E or F. The CO Protocol requires a screening analysis based on Level 4 of the Local CO Analysis Part 1.

A CO hot-spot screening analysis was completed based on the methodology provided in the CO Protocol. The Caltrans CALINE4 micro-scale dispersion model was used to calculate CO concentrations. The traffic volumes and associated concentrations are identical for each build alternative. A worst-case representative sample of intersections was chosen based on low LOS and high traffic volumes. CO concentrations at the analyzed intersections are shown in Tables 3.2.6-10 and 3.2.6-11. One-hour CO concentrations under project conditions would be approximately 4.6 ppm at worst-case sidewalk receptors in the year 2020 and 4.1 ppm in 2040. Eight-hour CO concentrations under project conditions would be approximately 3.2 ppm at worst-case sidewalk receptors in the year 2020, and 2.9 ppm in 2040. The state 1- and 8-hour standards of 20 and 9.0 ppm, respectively, would not be exceeded at the analyzed intersections; therefore, Alternative 1 would not result in a CO hot spot.

Table 3.2.6-10: Estimated Carbon Monoxide Concentrations – 2020

Interchange and Intersection	1-hour (ppm)	8-hour (ppm)
Bristol Street Interchange		
Bristol Street and I-405 northbound off-ramp/South Coast Plaza	4.5	3.2
Euclid Street and Ellis Avenue Interchange		
Euclid Street and I-405 northbound ramps/Newhope Street	4.2	3.0
I-405 southbound ramps and Ellis Avenue	3.8	2.7
Magnolia Street and Warner Avenue Interchange		
Magnolia Street and Warner Avenue	4.3	3.0
Beach Boulevard and Edinger Avenue Interchange		
Beach Boulevard and McFadden Avenue	4.6	3.2
Beach Boulevard and I-405 southbound ramps	4.5	3.2
Goldenwest Street and Bolsa Avenue Interchange		
Goldenwest Street and Bolsa Avenue	4.2	3.0
Springdale Street and Westminster Avenue Interchange		
Springdale Street and Westminster Avenue	4.0	2.8
Goldenwest Street and Bolsa Avenue Interchange		
I-405 northbound off-ramps/SR-22 eastbound ramps and Garden Grove Boulevard	4.3	3.0
Seal Beach Boulevard Interchange		
Seal Beach Boulevard and I-405 southbound ramps	4.6	3.2
Federal Standard	**20**	**9.0**

Source: *TAHA 2014.*

Table 3.2.6-11: Estimated Carbon Monoxide Concentrations – 2040

Interchange and Intersection	1-hour (ppm)	8-hour (ppm)
Bristol Street Interchange		
Bristol Street and I-405 northbound off-ramp/South Coast Plaza	3.8	2.7
Euclid Street and Ellis Avenue Interchange		
Euclid Street and I-405 northbound ramps/Newhope Street	3.7	2.6
I-405 southbound ramps and Ellis Avenue	3.5	2.5
Magnolia Street and Warner Avenue Interchange		
Magnolia Street and Warner Avenue	3.7	2.6
Beach Boulevard and Edinger Avenue Interchange		
Beach Boulevard and McFadden Avenue	3.9	2.8
Beach Boulevard and I-405 southbound ramps	4.1	2.9
Goldenwest Street and Bolsa Avenue Interchange		
Goldenwest Street and Bolsa Avenue	3.8	2.7
Springdale Street and Westminster Avenue Interchange		
Springdale Street and Westminster Avenue	3.7	2.6
Goldenwest Street and Bolsa Avenue Interchange		
I-405 northbound off-ramps/SR-22 eastbound ramps and Garden Grove Boulevard	3.5	2.5
Seal Beach Boulevard Interchange		
Seal Beach Boulevard and I-405 southbound ramps	3.6	2.5
Federal Standard	**20**	**9.0**

Source: Terry A. Hayes Associates Inc, 2014.

Alternative 2

Alternative 2 would include the same intersection improvements as Alternative 1 and also required a CO screening analysis. Intersections would experience similar volumes as analyzed for Alternative 1 as shown in Tables 3.2.6-10 and 3.2.6-11 (see Air Quality Technical Study Appendix H for volumes). The CO concentrations were well below the state 1- and 8-hour CO standards and would remain so under Alternative 2; therefore, Alternative 2 would not result in a CO hot spot.

Alternative 3 (Preferred Alternative)

Alternative 3 would include the same intersection improvements as Alternative 1 and also required a CO screening analysis. Intersections would experience similar volumes analyzed for Alternative 1 as shown in Tables 3.2.6-10 and 3.2.6-11 (see Air Quality Technical Study Appendix H for volumes). The CO concentrations were well below the state 1- and 8-hour CO standards and would remain so under Alternative 3; therefore, Alternative 3 would not result in a CO hot spot.

PM_{10} and $PM_{2.5}$ Qualitative Analysis related to Transportation Conformity

Pursuant to Federal Conformity Regulations (specifically, 40 CFR 93.105 [c] [1][i]), a qualitative analysis of the localized PM emissions was conducted following the methodology provided in the EPA Guidelines. The project was determined to be a POAQC through interagency consultation on January 25, 2011.

An emissions analysis based on the methodology outlined in the 2006 EPA Guidance was carried out for Alternative 3 and presented to the TCWG on October 28, 2014. Vehicle emission rates were determined using CARB's EMFAC2011 emission factor program. EMFAC2011 was made available by EPA for conformity analysis purposes on March 6, 2013. EMFAC produces emission rates for exhaust emissions, tire wear, and brake wear. In addition to those emissions, this project is located in an area where re-entrained road dust emissions must be included. The latest EPA AP-42 analysis method for paved road dust is used; paved road dust emissions are added to emissions estimated using EMFAC to determine the total emissions from the project or any network link. Emissions evaluated include direct exhaust emissions, tire wear, and brake wear. Paved road dust emissions were calculated and added to direct vehicle emissions.

To show that the project is unlikely to cause, or contribute to, or worsen existing PM hot-spots, emissions from the build alternatives must be equal to or lower than emissions from the No Build Alternative. The emission analysis for this project demonstrates that this criterion is met (see Table 3.2.6-12). TCWG concurred with this determination on October 28, 2014. Although Alternatives 1 and 2 were not presented to the TCWG, the regional emissions analysis above shows that PM2.5 and PM10 emissions decrease for each alternative.

In addition, the project cannot move emissions significantly closer to existing sensitive receptors and cannot cause intersection operation where a substantial number of diesel trucks are present to deteriorate below LOS D. This project also meets those criteria. The project will typically move mainline emissions 25 to 40 feet closer to sensitive receptors; however, there are a few areas where the widening is 60 to 80 feet. Given the overall reduction in emissions, this is not considered to be a significant reduction in distance to sensitive receptors.

Based on this emission analysis, the build alternatives would produce PM emissions that are lower than the No Build Alternative, would not reduce LOS at (an) intersection(s) with a substantial number of trucks to LOS D or worse, and would not move emissions significantly closer to existing sensitive receptors; therefore, the project is unlikely to cause, or contribute to, or worsen existing violations of the PM standards.

Table 3.2.6-12: Particulate Matter Emissions

Scenario	Pounds per Day	
	$PM_{2.5}$	PM_{10}
No Build Alternative (2020)	280	660
Alternative 3 (2020)	268	659
No Build Alternative (2040)	364	789
Alternative 3 (2040)	308	749

Source: Terry A. Hayes Associates Inc, 2014.

Mobile Source Air Toxics Analysis

Controlling air toxic emissions became a national priority with the passage of the CAAAs of 1990, whereby Congress mandated that EPA regulate 188 air toxics, also known as HAPs. EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment. These are acrolein, benzene, 1,3-butidiene, DPM plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics (MSATs), the list is subject to change and may be adjusted in consideration of future EPA rules.

According to EPA, MOVES improves upon the previous MOBILE model in several key aspects: MOVES is based on a vast amount of in-use vehicle data collected and analyzed since the latest release of MOBILE, including millions of emissions measurements from light-duty vehicles. Analysis of this data enhanced EPA's understanding of how mobile sources contribute to emissions inventories and the relative effectiveness of various control strategies. In addition, MOVES accounts for the significant effects that vehicle speed and temperature have on PM emissions estimates, whereas MOBILE did not. MOVES2010b includes all air toxic pollutants in the National Air Toxics Assessment (NATA) that are emitted by mobile sources. EPA has incorporated more recent data into MOVES2010b to update and enhance the quality of MSAT emission estimates. These data reflect advanced emission control technology and modern fuels, plus additional data for older technology vehicles. MSAT emission trends in California would be similar to the trends shown in Figure 3.2.6-6 when modeled using CT-EFMAC but with some slight differences in terms of the percentage changes in the future. Based on an FHWA analysis using EPA's MOVES2010b model, as shown, even if vehicle-miles travelled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision making within the context of NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect MSAT impacts to be addressed in environmental documents. FHWA, EPA, the Health Effects Institute (HEI), and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. FHWA will continue to monitor the developing research in this emerging field.

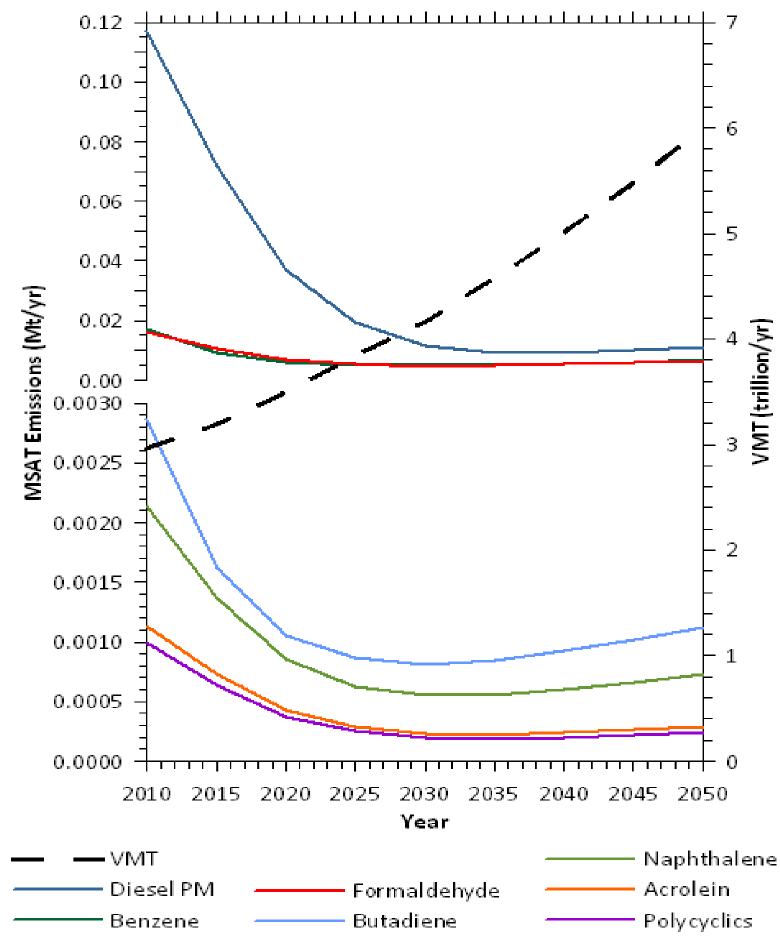


Figure 3.2.6-6: National MSAT Emission Trends 1999 - 2050 for Vehicles Operating on Roadways using EPA's MOBIL6.2 Model

Incomplete or Unavailable Information for Project Specific MSAT Impacts Analysis

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

EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the FCAA and its amendments and have specific statutory obligations with respect to HAP's and MSATs. EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain IRIS, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects." Each report contains assessments of noncancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

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

The methodologies for forecasting health impacts include emissions modeling, dispersion modeling, exposure modeling, and then final determination of health impacts, with each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology, which affects emissions rates, over that time frame because such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

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

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

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

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based upon Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community

Because of the uncertainties outlined above, a reliable quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects; therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

MSAT Emissions in the Project Area

FHWA, in its Interim Guidance published on September 30, 2009 (*Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*), recommends a range of options deemed appropriate for addressing and documenting the MSAT issue in NEPA documents. Based on the FHWA guidance, the proposed project has the potential for meaningful differences in MSAT emissions among project alternatives; therefore, level of emissions for the highest priority MSATs for the No Build Alternative and build alternatives was evaluated (Level 3 Analysis).

The basic procedure for analyzing emissions for on-road MSATs is to calculate emission factors using EMFAC2011 and apply the emission factors to speed and VMT data specific to the proposed project. EMFAC2011 is the emission inventory model developed by CARB, which calculates emission inventories for motor vehicles operating on roads in California. The emission factors used in this analysis are from EMFAC2011 and are specific to the Orange County portion of the basin. Results were produced for the existing year (2009), the first operational year once the proposed project is complete (2020), and the horizon year (2040). 2020 and 2040 analyses compared the No Build Alternative to the build alternatives resulting from implementation of the proposed project.

Alternative 1

Alternative 1 would have lower emissions compared to the No Build Alternative for the years 2020 and 2040 (Tables 3.2.6-13 and 3.2.6-14), respectively. The analysis also shows that MSAT emissions in 2020 and 2040 would be less than the existing (2009) conditions. Alternative 1 emissions would likely be lower than present levels in the design year as a result of EPA's and California's control programs that are projected to further reduce MSAT emissions.

Table 3.2.6-13: MSAT Emissions – 2020

Toxic Air Contaminant	2009 Existing Emissions (lb/day)	2020 No Build Emissions (lb/day)	2020 Build		
			Emissions (lb/day)	Existing Percent Change	No Build Percent Change
Alternative 1					
Diesel Particulate Matter (DPM)	78.3	26.8	22.3	(71.5)	(16.6)
Formaldehyde	42.9	32.6	15.0	(65.0)	(53.9)
1,3-Butadiene	8.4	4.4	2.4	(71.0)	(44.1)
Benzene	37.2	21.0	11.3	(69.6)	(45.9)
Acrolein	1.9	1.0	0.6	(70.6)	(43.2)
Acetaldehyde	15.1	12.7	5.5	(63.6)	(56.5)

Table 3.2.6-13: MSAT Emissions – 2020

Toxic Air Contaminant	2009 Existing Emissions (lb/day)	2020 No Build Emissions (lb/day)	2020 Build		
			Emissions (lb/day)	Existing Percent Change	No Build Percent Change
Alternative 2					
DPM	78.3	26.8	24.7	(68.5)	(7.8)
Formaldehyde	42.9	32.6	14.3	(66.6)	(56.0)
1,3-Butadiene	8.4	4.4	2.5	(70.4)	(42.9)
Benzene	37.2	21.0	11.5	(69.2)	(45.3)
Acrolein	1.9	1.0	0.6	(70.0)	(42.0)
Acetaldehyde	15.1	12.7	5.1	(66.1)	(59.5)
Alternative 3					
DPM	78.3	26.8	24.7	(68.5)	(7.8)
Formaldehyde	42.9	32.6	14.5	(66.1)	(55.4)
1,3-Butadiene	8.4	4.4	2.5	(70.0)	(42.3)
Benzene	37.2	21.0	11.6	(68.9)	(44.7)
Acrolein	1.9	1.0	0.6	(69.7)	(41.5)
Acetaldehyde	15.1	12.7	5.2	(65.6)	(58.9)
Note: Percent change is calculated as (B-A)/A. For example, the existing percent change for diesel particulate matter in Alternative 1 is (28.6-78.3)/78.3					

Source: Terry A. Hayes Associates Inc, 2014.

Table 3.2.6-14: MSAT Emissions – 2040

Toxic Air Contaminant	2009 Existing Emissions (lbs/day)	2040 No Build Emissions (lbs/day)	2040 Build		
			Emissions (lbs/day)	Existing Percent Change	No Build Percent Change
Alternative 1					
Diesel Particulate Matter (DPM)	78.3	30.4	24.7	(68.5)	(19.0)
Formaldehyde	42.9	75.4	28.4	(33.8)	(62.3)
1,3-Butadiene	8.4	6.7	3.4	(59.4)	(49.1)
Benzene	37.2	34.4	16.6	(55.4)	(51.8)
Acrolein	1.9	1.4	0.8	(59.9)	(47.0)
Acetaldehyde	15.1	32.4	11.4	(24.4)	(64.6)
Alternative 2					
DPM	78.3	30.4	22.2	(71.6)	(27.0)
Formaldehyde	42.9	75.4	15.4	(64.1)	(79.5)
1,3-Butadiene	8.4	6.7	2.2	(73.6)	(66.9)
Benzene	37.2	34.4	10.4	(72.0)	(69.7)
Acrolein	1.9	1.4	0.5	(73.7)	(65.2)
Acetaldehyde	15.1	32.4	5.9	(60.8)	(81.7)
Alternative 3					
DPM	78.3	30.4	22.7	(71.1)	(25.5)
Formaldehyde	42.9	75.4	16.6	(61.2)	(77.9)
1,3-Butadiene	8.4	6.7	2.4	(71.7)	(64.5)
Benzene	37.2	34.4	11.2	(69.8)	(67.4)
Acrolein	1.9	1.4	0.5	(71.6)	(62.5)
Acetaldehyde	15.1	32.4	6.4	(57.8)	(80.3)
Note: Percent change is calculated as (B-A)/A. For example, the existing percent change for diesel particulate matter in Alternative 1 is (24.7-78.3)/78.3					

Source: Terry A. Hayes Associates Inc, 2014.

Construction MSAT Emissions

Construction activity may generate a temporary increase in MSAT emissions. Project-level assessments that render a decision to pursue construction emission mitigation would benefit from a number of technologies and operational practices that should help lower short-term MSATs. Construction minimization and avoidance measures include strategies that reduce engine activity or reduce emissions per unit of operating time, such as reducing the number of trips and the amount of extended idling. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits when sites are near populated areas. For example, agreements that stress work activity outside normal hours of an adjacent school campus would be operations-oriented mitigation. Verified emissions control technology retrofits or fleet modernization of engines for construction equipment could be appropriate mitigation strategies. Technology retrofits could include PM traps, oxidation catalysts, and other devices that provide an after treatment of exhaust emissions. Implementing maintenance programs per manufacturers' specifications to ensure engines perform at EPA certification levels, as applicable, and to ensure retrofit technologies perform at verified standards, as applicable, could also be deemed appropriate. The use of clean fuels, such as ultra-low sulfur diesel, biodiesel, or natural gas also can be a very cost-beneficial strategy. EPA has listed many approved diesel retrofit technologies; many of these can be deployed as emissions minimization measures for equipment used in construction.

Alternative 2

Alternative 2 would have lower emissions compared to the No Build Alternative for the years 2020 and 2040 (Tables 3.2.6-13 and 3.2.6-14), respectively. The analysis also shows that MSAT emissions in 2020 and 2040 would be less than the existing (2009) conditions. Alternative 2 emissions would likely be lower than present levels in the design year as a result of EPA's and California's control programs that are projected to further reduce MSAT emissions. In addition, similar to Alternative 1, Alternative 2 would not result in adverse construction MSAT emissions.

Alternative 3 (Preferred Alternative)

Alternative 3 would have lower emissions compared to the No Build Alternative for the years 2020 and 2040 (Tables 3.2.6-13 and 3.2.6-14), respectively. The analysis also shows that MSAT emissions in 2020 and 2040 would be less than the existing (2009) conditions. Alternative 3 emissions would likely be lower than present levels in the design year as a result of EPA's and California's control programs that are projected to further reduce MSAT emissions. In addition, similar to Alternative 1, Alternative 3 would not result in adverse construction MSAT emissions.

Diesel Particulate Matter

In 1998, California identified DPM (diesel particulate matter) as a TAC based on its potential to cause cancer, premature death, and other health problems. This assessment formed the basis for a decision by CARB to formally identify particles in diesel exhaust as a TAC that may pose a threat to human health.

Diesel engines emit a complex mix of pollutants, the most visible of which are very small carbon particles or "soot," known as DPM. Diesel exhaust also contains more than 40 cancer-causing substances, most of which are readily adsorbed on the soot particles. These include many known or suspected cancer-causing substances, such as benzene, arsenic, and formaldehyde.

Overall, diesel engine emissions are responsible for most of California's estimated cancer risk attributable to air pollution. In addition, DPM is a significant fraction of California’s particulate pollution problem. Assessments by CARB and EPA estimate that DPM annually contributes to approximately 3,500 premature respiratory and cardiovascular deaths and thousands of hospital admissions, asthma attacks, and other respiratory symptoms.

CARB has found that DPM contributes more than 70 percent of the known risk from air toxics and poses the greatest cancer risks among all identified air toxics. Diesel trucks contribute more than half of the total diesel combustion sources; however, CARB has adopted a Diesel Risk Reduction Plan (DRRP) with control measures that would reduce the overall DPM emissions by approximately 85 percent from 2000 to 2020. In addition, total toxic risk from diesel exhaust may only be exposed for a much shorter duration. Furthermore, DPM is only one of many environmental toxics, and those of other toxics and other pollutants in various environmental media may overshadow its cancer risks; therefore, while diesel exhaust may pose potential cancer risks to receptors spending time on or near high-risk DPM facilities, most receptors’ short term exposure would only cause minimal harm, and these risks would also greatly diminish in the future operating years of the proposed project due to planned emission control regulations.

No Build Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor; therefore, the No Build Alternative would not result in an adverse impact related to DPM emissions.

Alternative 1

A daily increase in DPM emissions would result from additional trucks in the fleet mix or lower vehicle speeds. Alternative 1 would not increase the percentage of trucks in the fleet mix and would improve vehicle speeds in the project area. As a result, Alternative 1 DPM emissions would likely be less than future no build emissions; therefore, Alternative 1 would not have an adverse operational DPM impact.

Alternative 2

A daily increase in DPM emissions would result from additional trucks in the fleet mix or lower vehicle speeds. Alternative 2 would not increase the percentage of trucks in the fleet mix and would improve vehicle speeds in the project area. As a result, Alternative 2 DPM emissions would likely be less than future no build emissions; therefore, Alternative 2 would not have an adverse operational DPM impact.

Alternative 3 (Preferred Alternative)

A daily increase in DPM emissions would result from additional trucks in the fleet mix or lower vehicle speeds. Alternative 3 would not increase the percentage of trucks in the fleet mix and would improve vehicle speeds in the project area. As a result, Alternative 3 DPM emissions would likely be less than future no build emissions; therefore, Alternative 3 would not have an adverse operational DPM impact.

Naturally Occurring Asbestos

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have commonly been used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released into the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos-bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. Serpentinite may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, which is a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock. Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in the counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology, have developed a map of the state showing the general location of ultramafic rock in the state.[19] Orange County has not been identified as containing serpentinite and ultramafic rock.

Build Alternatives

The California Division of Mines and Geology (CDMG) Geological Map Index was searched for available geological maps that cover the project study area and surrounding areas. These geological maps indicate geological formations, which are overlaid on a topographic map. Some maps focus on specific issues (e.g., bedrock, sedimentary rocks), while others may identify artificial fills, including landfills. Geological maps can be effective in estimating permeability

[19] ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf

and other factors that influence the spread of contamination. According to *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos* (August 2000), the project corridor is not located in a known or suspected asbestos area.

Naturally Occurring Asbestos (NOA) in bedrock is typically associated with serpentine and peridotite deposits; therefore, the potential for NOA to be present within the project limits is considered to be low. Furthermore, prior to the commencement of construction, qualified geologists would further examine the soils and makeup of the existing structure. Should the project geologist encounter asbestos during the analysis, proper steps shall be executed to handle the materials. Note that during demolition activities, the likelihood of encountering structural asbestos is low due to the nature of the demolished materials. The material would consist of concrete and metal piping; therefore, none of the build alternatives would result in an adverse impact related to NOA.

Climate Change

Climate change is analyzed in Chapter 4 (Section 4.2.7). Neither EPA nor FHWA has promulgated explicit guidance or methodology to conduct project-level greenhouse gas analysis (GHG) analysis. As stated on FHWA's climate change Web site http://www.fhwa.dot.gov/hep/climate/index.htm), climate change considerations should be integrated throughout the transportation decision-making process, from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project-level decision making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, the issue is addressed in the CEQA chapter (Chapter 4, Section 4.2.7) of this environmental document and may be used to inform the NEPA decision. The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the state has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours traveled.

3.2.6.4 Avoidance, Minimization, and/or Mitigation Measures

Temporary Measures

Most of the construction impacts to air quality are short term in duration; therefore, they will not result in long-term adverse conditions. Implementation of the following measures, some of which may also be required for other purposes, such as stormwater pollution control, will reduce any air quality impacts resulting from construction activities:

AQ-1: The construction contractor shall comply with Caltrans' Standard Specifications in Section 14(2010).

- Section 14-9.01 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
- Section 14-9.02 is directed at controlling dust. If dust palliative materials other than water are to be used, material specifications are contained in Section 18.

AQ-2: The construction contractor shall apply water or dust palliative to the site and equipment as frequently as necessary to control fugitive dust emissions. Fugitive emissions generally must meet a "no visible dust" criterion either at the point of emission or at the ROW line, depending on local regulations.

AQ-3: The construction contractor shall spread soil binder on any unpaved roads used for construction purposes, and all project construction parking areas.

AQ-4: The construction contractor shall wash off trucks as they leave the ROW, as necessary, to control fugitive dust emissions.

AQ-5: The construction contractor shall properly tune and maintain construction equipment and vehicles.

AQ-6: The construction contractor shall use low-sulfur fuel in all construction equipment as provided in CCR Title 17, Section 93114.

AQ-7: The construction contractor shall develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.

AQ-8: The construction contractor shall locate equipment and materials storage sites as far away from residential and park uses as practical. Construction areas shall be kept clean and orderly.

AQ-9: The construction contractor shall establish Environmentally Sensitive Areas (ESAs) or their equivalent near sensitive air receptors within which construction activities involving extended idling of diesel equipment would be prohibited, to the extent that is feasible.

AQ-10: The construction contractor shall use track-out reduction measures, such as gravel pads, at project access points to minimize dust and mud deposits on roads affected by construction traffic.

AQ-11: The construction contractor shall cover all transported loads of soils and wet materials prior to transport, or provide adequate freeboard (space from the top of the material to the top of the truck) to reduce PM_{10} and deposition of PM during transportation.

AQ-12: The construction contractor shall remove dust and mud that are deposited on paved, public roads due to construction activity and traffic to decrease PM.

AQ-13 The construction contractor shall route and schedule construction traffic to avoid peak travel times as much as possible to reduce congestion and related air quality impacts caused by idling vehicles along local roads.

AQ-14: The construction contractor shall install mulch or plant vegetation as soon as practical after grading to reduce windblown particulate in the area.

Permanent Measures

No adverse operational impacts were identified, and no operational avoidance, minimization, and/or mitigation measures are required.

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