5.2 AIR QUALITY

This Section of the DSEIR compares the air quality impacts of the Modified Project to the air quality impacts of the Approved Project. The analysis in this Section is based on the following:

Great Park Neighborhoods Air Quality Technical Report, ENVIRON, May 2011.
A complete copy of this study is included in Appendix G to this DSEIR.

5.2.1 Environmental Setting

South Coast Air Basin

The Proposed Project Site lies within the South Coast Air Basin ("SoCAB"), which includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The SoCAB is in a coastal plain with connecting broad valleys and low hills and is bounded by the Pacific Ocean in the southwest quadrant, with high mountains forming the remainder of the perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild weather pattern is interrupted infrequently by periods of extremely hot weather, winter storms, and Santa Ana winds.

Temperature and Precipitation

The annual average temperature varies little throughout the SoCAB, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station nearest to the Proposed Project Site is the Tustin Irvine Ranch Station Monitoring Station (ID 049087). The average low is reported at 40.2°F in January while the average high is 85.2°F in August (WRCC 2011).

In contrast to a very steady pattern of temperature, rainfall is seasonally and annually highly variable. Almost all rain falls from November through April. Summer rainfall is normally restricted to widely scattered thundershowers near the coast, with slightly heavier shower activity in the east and over the mountains. Rainfall averages around 12.86 inches per year in the project area, as measured in Irvine (WRCC 2011).

Humidity

Although the SoCAB has a semi-arid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the SoCAB by offshore winds, the ocean effect is dominant. Periods of heavy fog, especially along the coastline, are frequent; low stratus clouds, often referred to as high fog, are a characteristic climatic feature. Annual average humidity is 70 percent at the coast and 57 percent in the eastern portions of the SoCAB.

Wind

Wind patterns across the south coastal region are characterized by westerly and southwesterly onshore winds during the day and easterly or northeasterly breezes at night. Wind speed is somewhat greater during the dry summer months than during the rainy winter season.

Between periods of wind, periods of air stagnation may occur, both in the morning and evening hours. Air stagnation is one of the critical determinants of air quality conditions on any given day. During the winter and fall months, surface high-pressure systems over the SoCAB, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally continue a few days before predominant meteorological conditions are reestablished.

The mountain ranges to the east of the SoCAB affect the transport and diffusion of pollutants by inhibiting the eastward transport of pollutants. Air quality in the SoCAB generally ranges from fair to poor and is similar to air quality in most of coastal southern California. The entire region experiences heavy concentrations of air pollutants during prolonged periods of stable atmospheric conditions.

Inversions

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, there are two similarly distinct types of temperature inversions that control the vertical depth through which pollutants are mixed. These inversions are the marine/subsidence inversion and the radiation inversion. The height of the base of the inversion at any given time is known as the "mixing height." The combination of winds and inversions are critical determinants in leading to the highly degraded air quality in summer and the generally good air quality in the winter in the vicinity of Proposed Project Site.

Air Pollutants of Concern

Criteria Air Pollutants

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and state law. Air pollutants are categorized as primary or secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_X), sulfur dioxide (SO_2), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb) are primary air pollutants. Of these, CO, SO_2, NO_x, PM_{10}, and $PM_{2.5}$ are "criteria air pollutants," which means that ambient air quality standards (AAQS) have been established for them. VOC and NO_X are criteria pollutant precursors that form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone (O_3) and nitrogen dioxide (NO_2) are the principal secondary pollutants.

A description of each of the primary and secondary criteria air pollutants and their known health effects is presented below. Other pollutants, such as carbon dioxide (CO_2), a natural by-product of animal respiration that is also produced in the combustion process, have been linked to phenomena such as global climate change. These emissions are unregulated and the South Coast Air Quality Management District ("SCAQMD") has not yet adopted thresholds for them applicable to residential and commercial development projects. Greenhouse gas ("GHG") emissions that affect global climate change, including CO_2, methane (CH_4), nitrous oxide (N_2O), and fluorinated gases, are discussed in Chapter 5.3, *Greenhouse Gas Emissions*, of this DSEIR.

Carbon Monoxide (CO) is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation (SCAQMD 2005).

Volatile Organic Compounds (VOC)[1] are compounds comprised primarily of atoms of hydrogen and carbon. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of VOCs include evaporative emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by VOCs, but rather by reactions of VOCs to forms of secondary pollutants such as ozone (SCAQMD 2005).

Nitrogen Oxides (NO_X) serve as integral participants in the process of photochemical smog production. The two major forms of NO_X are nitric oxide (NO) and nitrogen dioxide (NO_2). NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown irritating gas formed by the combination of NO and oxygen. NO_X acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens (SCAQMD 2005).

NO_2 is a by-product of fuel combustion. The principal form of NO_2 produced by combustion is NO, but NO reacts with oxygen to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in children (two and three years old) has also been observed at concentrations below 0.3 part per million (ppm). NO_2 absorbs blue light; the result is a brownish-red cast to the atmosphere and reduced visibility. NO_2 also contributes to the formation of PM_{10}, $PM_{2.5}$, and ozone (SCAQMD 2005).

Sulfur Dioxide (SO_2) is a colorless, pungent, irritating gas formed by the combustion of sulfurous fossil fuels. Fuel combustion is the primary source of SO_2. At sufficiently high concentrations, SO_2 may irritate the upper respiratory tract. At lower concentrations and when combined with particulates, SO_2 may do greater harm by injuring lung tissue. A primary source of SO_2 emissions is high-sulfur-content coal. Gasoline and natural gas have very low sulfur content and hence do not release significant quantities of SO_2 (SCAQMD 2005).

Particulate Matter (PM) consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are now recognized and regulated. Inhalable course particles, or PM_{10}, include the particulate matter with an aerodynamic diameter of 10 microns (i.e., 10 one-millionths of a meter or 0.0004 inch) or less. Inhalable fine particles, or $PM_{2.5}$, have an aerodynamic diameter of 2.5 microns (i.e., 2.5 one-millionths of a meter or 0.0001 inch) or less. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind action on arid landscapes also contributes substantially to local particulate loading. Both PM_{10} and $PM_{2.5}$ may adversely affect the human respiratory system, especially in those people who are naturally sensitive or susceptible to breathing problems (SCAQMD 2005).

Fugitive dust primarily poses two public health and safety concerns. The first concern is that of respiratory problems attributable to the particulates suspended in the air. Diesel particulates are classified by the California Air Resources Board ("CARB") as a carcinogen. The second concern is that of motor vehicle accidents caused by reduced visibility during severe wind conditions. Fugitive dust may also cause significant property damage during strong windstorms by acting as an abrasive material agent (much like sandblasting activities). Finally, fugitive dust can result in a nuisance factor due to the soiling of proximate structures and vehicles (SCAQMD 2005).

[1] The Certified EIR used the term reactive organic gases (ROG) instead of VOC. However, for this purpose, the terms are synonymous.

Ozone (O_3), or smog, is one of a number of substances called photochemical oxidants that are formed when VOC and NO_X (both by-products of the internal combustion engine) react with sunlight. O_3 is present in relatively high concentrations in the SoCAB, and the damaging effects of photo chemical smog are generally related to the concentrations of O_3. O_3 poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. Additionally, O_3 has been tied to crop damage, typically in the form of stunted growth and premature death. O_3 can also act as a corrosive, resulting in property damage such as the degradation of rubber products (SCAQMD 2005).

Lead (Pb) concentrations decades ago exceeded the state and federal AAQS by a wide margin, but have not exceeded state or federal air quality standards at any regular monitoring station since 1982 (SCAQMD 2005). However, in 2008 the USEPA and CARB adopted more strict lead standards and special monitoring sites immediately downwind of lead sources[2] recorded very localized violations of the new state and federal standards. As a result of these localized violations, the Los Angeles County portion of the SoCAB was designated in 2010 as nonattainment under the California and National AAQS for lead (SCAQMD 2010). The Approved Project and Modified Project are not characteristic of industrial-type projects that have the potential to emit lead. Therefore, lead is not a pollutant of concern for the Approved Project or the Modified Project.

Toxic Air Contaminants

The public's exposure to air pollutants classified as toxic air contaminants (TACs) is a significant environmental health issue in California. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The California Health and Safety Code defines a TAC as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." A substance that is listed as a hazardous air pollutant ("HAP") pursuant to Section 112(b) of the federal Clean Air Act (42 United States Code §7412[b]) is a toxic air contaminant. Under state law, the California Environmental Protection Agency ("EPA"), acting through CARB, is authorized to identify a substance as a TAC if it determines that the substance is an air pollutant that may cause or contribute to an increase in mortality or to an increase in serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through Assembly Bill (AB) 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics "Hot Spot" Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an "airborne toxics control measure" for sources that emit designated TACs. If there is a safe threshold for a substance (i.e., a point below which there is no toxic effect), the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions. To date, CARB has established formal control measures for 11 TACs, all of which are identified as having no safe threshold.

Air toxics from stationary sources are also regulated in California under the Air Toxics "Hot Spot" Information and Assessment Act of 1987. Under AB 2588, toxic air contaminant emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment and, if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

[2] Source-oriented monitors record concentrations of lead at lead-related industrial facilities in the SoCAB, which include Exide Technologies in the City of Commerce, Quemetco, Inc. in the City of Industry, Trojan Battery Company in Santa Fe Springs, and Exide Technologies in Vernon. Monitoring conducted between 2004 through 2007 identified that the Trojan Battery Company and Exide Technologies exceed the federal standards (SCAQMD 2010).

Since the last update to the TAC list in December 1999, CARB has designated 244 compounds as TACs (CARB 1999). Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines.

In 1998, CARB identified particulate emissions from diesel-fueled engines (diesel PM) as a TAC. Previously, the individual chemical compounds in diesel exhaust were considered as TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

In 2000, SCAQMD conducted a study on ambient concentrations of TACs and estimated the potential health risks from air toxics. The results showed that the overall risk for excess cancer from a lifetime exposure to ambient levels of air toxics was about 1,400 in a million. The largest contributor to this risk was diesel exhaust, accounting for 71 percent of the air toxics risk. In 2008, the SCAQMD conducted its third update to its study on ambient concentrations of TACs and estimated the potential health risks from air toxics. The results showed that the overall risk for excess cancer from a lifetime exposure to ambient levels of air toxics was about 1,200 in one million. The largest contributor to this risk was diesel exhaust, accounting for approximately 84 percent of the air toxics risk (SCAQMD 2008). In the vicinity of the Proposed Project Site, excess cancer risk ranges from 395 to 652 (SCAQMD 2011).

Regulatory Framework

AAQS have been promulgated at the local, state, and federal levels for criteria pollutants. The Proposed Project Site is in the SoCAB and is subject to the rules and regulations imposed by the SCAQMD, as well as, the California Ambient Air Quality Standards ("CAAQS") adopted by CARB and federal National Ambient Air Quality Standards ("NAAQS").

Ambient Air Quality Standards

The Clean Air Act (CAA) was passed in 1963 by the US Congress and has been amended several times. The 1970 Clean Air Act amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including nonattainment requirements for areas not meeting NAAQS and the Prevention of Significant Deterioration program. The 1990 amendments represent the latest in a series of federal efforts to regulate the protection of air quality in the United States. The CAA allows states to adopt more stringent standards or to include other pollution species. The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the state to achieve and maintain the CAAQS by the earliest practical date. The CAAQS tend to be more restrictive than the NAAQS and are based on even greater health and welfare concerns.

These NAAQS and CAAQS are the levels of air quality considered to provide a margin of safety in the protection of the public health and welfare. They are designed to protect those "sensitive receptors" most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both California and the federal government have established health-based AAQS for seven air pollutants. As shown in Table 5.2-1, these pollutants include O_3, NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, and lead (Pb). In addition, the state has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

Table 5.2-1

Ambient Air Quality Standards for Criteria Pollutants

Pollutant	*Averaging Time*	*California Standard*	*Federal Primary Standard*	*Major Pollutant Sources*
Ozone (O_3)	1 hour	0.09 ppm	*	Motor vehicles, paints, coatings, and solvents.
	8 hours	0.070 ppm	0.075 ppm	
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm	
Nitrogen Dioxide (NO_2)	Annual Average	0.030 ppm	0.053 ppm	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	1 hour	0.18 ppm	0.100 ppm	
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	0.075 ppm	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	24 hours	0.04 ppm	*	
Suspended Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	*	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	50 µg/m^3	150 µg/m^3	
Suspended Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	15.0 µg/m^3	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	*	35 µg/m^3	
Lead (Pb)	Monthly	1.5 µg/m^3	*	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	*	1.5 µg/m^3	
	3-Month Average	*	0.15 µg/m^3	

Table 5.2-1
Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Major Pollutant Sources
Visibility Reducing Particles	8 hours	ExCo =0.23/km visibility of 10≥ miles[1]	No Federal Standard	Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt.
Sulfates	24 hours	25 µg/m^3	No Federal Standard	Sulfates (SO_4^{2-}) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and / or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.
Hydrogen Sulfide	1 hour	0.03 ppm	No Federal Standard	Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation.
Vinyl Chloride	24 hour	0.01 ppm	No Federal Standard	Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Source: CARB 2010.
ppm: parts per million; µg/m^3: micrograms per cubic meter
ExCo: Extinction Coefficient
[1] When relative humidity is less than 70 percent.
* Standard has not been established for this pollutant/duration by this entity.

Air Quality Management Planning

The SCAQMD and the Southern California Association of Governments (SCAG) are the agencies responsible for preparing the Air Quality Management Plan (AQMP) for the SoCAB. Since 1979, a number of AQMPs have been prepared.

The most recently adopted comprehensive plan is the 2007 AQMP, which was adopted on June 1, 2007, and which incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. The 2007 AQMP proposes attainment demonstration of the federal $PM_{2.5}$ standards through a more focused control of SO_X, directly emitted $PM_{2.5}$, and focused control of NO_X and VOC by 2015. The eight-hour ozone control strategy builds upon the $PM_{2.5}$ strategy, augmented with additional NO_X and VOC reductions to meet the standard by 2024, assuming an extended attainment date is obtained.

The AQMP provides local guidance for the State Implementation Plan, which provides the framework for air quality basins to achieve attainment of the state and federal ambient air quality standards. Areas that meet ambient air quality standards are classified as attainment areas, while areas that do not meet these standards are classified as nonattainment areas. Severity classifications for nonattainment range in magnitude: marginal, moderate, serious, severe, and extreme. The attainment status for the SoCAB is listed in Table 5.2-2. The SoCAB is designated as in attainment of the CAAQS for SO_2, and sulfates. According to the 2007 AQMP, the SoCAB will have to meet the new federal $PM_{2.5}$ standards by 2015 and the 8-hour ozone standard by 2024, and will most likely have to achieve the recently revised 24-hour $PM_{2.5}$ standard by 2020. The SCAQMD has recently designated the SoCAB as nonattainment for NO_2 (entire basin) and lead (Los Angeles County only) under the CAAQS and has requested to designated the SoCAB as attainment/maintenance for PM_{10} under the NAAQS.

Table 5.2-2
Attainment Status of Criteria Pollutants in the South Coast Air Basin

Pollutant	State	Federal
Ozone – 1-hour	Extreme Nonattainment	Extreme Nonattainment[1]
Ozone – 8-hour	Extreme Nonattainment	Severe-17 Nonattainment[2]
PM_{10}	Serious Nonattainment	Serious Nonattainment Proposed Attainment/Maintenance[3]
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Attainment[4]
NO_2	Nonattainment[5]	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Nonattainment[6]	Nonttainment[6]
All others	Attainment/Unclassified	Attainment/Unclassified

Source: CARB 2010.

[1] Under prior standard.

[2] SCAQMD may petition for "Extreme Nonattainment" designation.

[3] Annual standard revoked September 2006. CARB approved the SCAQMD's request to redesignate the SoCAB from serious nonattainment for PM_{10} to attainment for PM_{10} under the National AAQS on March 25, 2010 because the SoCAB has not violated federal 24-hour PM_{10} standards during the period from 2004 to 2007. However, the USEPA has not yet approved this request.

[4] The EPA granted the request to redesignate the SoCAB from nonattainment to attainment for the CO NAAQS on May 11, 2007 (Federal Register Volume 71, No. 91), which became effective June 11, 2007.

[5] The state NO_2 standard was made more strict in 2007 from 0.25 ppm to 0.18 ppm. Under the revised standards, the entire SoCAB was designated nonattainment on March 25, 2010. In addition, the USEPA adopted a new 1-hour NO_2 standard of 0.100 ppm on January 22, 2010.

[6] The Los Angeles County portion of the SoCAB was designated nonattainment for lead under the new federal and existing state AAQS as a result of large industrial emitters. Remaining areas within the SoCAB, including the area in which the Proposed Project Site is located, are unclassified.

Existing Ambient Air Quality

Existing levels of ambient air quality and historical trends and projections in the vicinity of the Proposed Project Site and the City of Irvine are best documented by measurements made by SCAQMD. The Proposed Project Site is located within Source Receptor Area (SRA) 19 – Saddleback Valley (Central Orange County). The air quality monitoring station closest to the Proposed Project Site is the Mission Viejo Monitoring Station. However, this station does not monitor NO_2 or SO_x. Consequently, data was obtained from the Costa Mesa Monitoring Station for these criteria pollutants. Data from these stations are summarized in Table 5.2-3. The data shows that the area occasionally exceeds the state and federal one-hour and eight-hour O_3 standards. The data also indicates that the area occasionally exceeds the state PM_{10} and federal $PM_{2.5}$ standards. The federal PM_{10} standard has not been violated in the last five years at the Mission Viejo Monitoring Station. The CO, SO_2, or NO_2 standard have not been violated in the last five years at the Mission Viejo (CO) and Costa Mesa (SO_2 and NO_2) Monitoring Stations.

Table 5.2-3
Ambient Air Quality Monitoring Summary

Pollutant/Standard	Number of Days Threshold Were Exceeded and Maximum Levels during Such Violations				
	2005	2006	2007	2008	2009
Ozone (O_3)[1]					
State 1-Hour ≥ 0.09 ppm	3	13	5	9	7
State 8-hour ≥ 0.07 ppm	10	23	10	25	14
Federal 8-Hour > 0.075[2] ppm	6	12	5	15	10
Max. 1-Hour Conc. (ppm)	0.125	0.123	0.108	0.118	0.121
Max. 8-Hour Conc. (ppm)	0.086	0.106	0.090	0.104	0.095
Carbon Monoxide (CO)[1]					
State 8-Hour > 9.0 ppm	0	0	0	0	0
Federal 8-Hour ≥ 9.0 ppm	0	0	0	0	0
Max. 8-Hour Conc. (ppm)	1.59	1.64	2.16	1.10	1.00
Nitrogen Dioxide (NO_2)[3]					
State 1-Hour ≥ 0.18[4] ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.085	0.101	0.074	0.081	0.065
Sulfur Dioxide (SO_2)[3]					
State 1-Hour ≥ 0.04 ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.008	0.005	0.004	0.003	0.004
Coarse Particulates (PM_{10})[1]					
State 24-Hour > 50 µg/m^3	0	1	3	0	1
Federal 24-Hour > 150 µg/m^3	0	0	0	0	0
Max. 24-Hour Conc. (µg/m^3)	41.0	57.0	74.0	42.0	56.0
Fine Particulates ($PM_{2.5}$)[1]					
Federal 24-Hour > 35[5,6] µg/m^3	0	1	2	0	1
Max. 24-Hour Conc. (µg/m^3)	35.3	46.9	46.8	32.6	39.2

Source: SCAQMD 2011.
ppm: parts per million; µg/m^3: or micrograms per cubic meter; NS: No Standard.
[1] Data obtained from the Mission Viejo Monitoring Station.
[2] The USEPA recently revised the 8-hour O_3 standard from 0.08 ppm to 0.075 ppm, effective May 2008.
[3] Data obtained from the Costa Mesa Monitoring Station.
[4] The NO_2 standard was amended on February 22, 2007, to lower the 1-hr standard from 0.25 ppm to 0.18 ppm.
[5] Percentage of samples exceeding standard.
[6] The USEPA revised the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3; this standard did not take effect until December 2006.

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases.

Residential areas are also considered to be sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Other sensitive receptors include retirement facilities, hospitals, and schools. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial, commercial, retail, and office areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public (SCAQMD 1993, SCAQMD 2003, SCAQMD 2005).

5.2.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the City has determined that a project would normally have a significant effect on the environment if the project would:

AQ-1 Conflict with or obstruct implementation of the applicable air quality plan.

AQ-2 Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

AQ-3 Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

AQ-4 Expose sensitive receptors to substantial pollutant concentrations.

AQ-5 Create objectionable odors affecting a substantial number of people.

Chapter 8, *Impacts Found Not to Be Significant,* substantiates the City's determination in the Initial Study for the Modified Project (Appendix A to this DSEIR) that impacts associated with the following impacts would be less than significant: AQ-5. This impact will not be addressed in the following analysis.

South Coast Air Quality Management District Thresholds

Regional Significance Thresholds

CEQA allows for a lead agency to utilize the significance criteria established by the applicable air quality management or air pollution control district to assess the significance of a project's impacts on air quality. The SCAQMD has established thresholds of significance for air quality for construction activities and project operation as shown in Table 5.2-4. There are other state and federal criteria pollutants such as lead (state and federal) and hydrogen sulfide (state only) that are not relevant to this analysis.

Table 5.2-4
SCAQMD Regional Significance Thresholds

Air Pollutant	Construction Phase	Operational Phase
Volatile Organic Compounds (VOC)	75 lbs/day	55 lbs/day
Nitrogen Oxides (NO_X)	100 lbs/day	55 lbs/day
Carbon Monoxide (CO)	550 lbs/day	550 lbs/day
Sulfur Oxides (SO_X)	150 lbs/day	150 lbs/day
Particulates (PM_{10})	150 lbs/day	150 lbs/day
Fine particulates ($PM_{2.5}$)	55 lbs/day	55 lbs/day
Lead (Pb)[1]	3 lbs/day	3 lbs/day

Source: SCAQMD 2011
[1] Lead is typically generated by industrial project and is not a pollutant of concern for the Approved Project or the Modified Project.

CO Hotspot Thresholds

Localized CO impacts are determined based on the presence of congested intersections. The significance of localized project impacts depends on whether the project would cause substantial concentrations of CO. A project is considered to have a significant impact if project-related mobile-source emissions result in an exceedance of the California one-hour and eight-hour CO standards, which are:

- 1 hour = 20 parts per million
- 8 hour = 9 parts per million

Localized Significance Thresholds

The SCAQMD has developed localized significance thresholds ("LSTs") for emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$ generated at a project site (off-site mobile-source emissions are not included the LST analysis). LSTs represent the maximum emissions at a project site that are not expected to cause or contribute to an exceedance of the most stringent federal or state AAQS. Projects larger than five acres can determine the localized significance for construction by performing dispersion modeling using the thresholds in Table 5.2-5 for emissions that exceed the LSTs.

Table 5.2-5
SCAQMD Localized Significance Thresholds

Air Pollutant Standard (Relevant AAQS)	Concentration
1-Hour CO Standard (CAAQS)	20 ppm
8-Hour CO Standard (CAAQS)	9.0 ppm
1-Hour NO_2 Standard (CAAQS)	0.18 ppm
24-Hour PM_{10} Standard – Construction (SCAQMD)[1]	10.4 µg/m^3
24-Hour $PM_{2.5}$ Standard – Construction (SCAQMD)[1]	10.4 µg/m^3
24-Hour PM_{10} Standard – Operation (SCAQMD)[1]	2.5 µg/m^3
24-Hour $PM_{2.5}$ Standard – Operation (SCAQMD)[1]	2.5 µg/m^3

ppm – parts per million
µg/m3 – micrograms per cubic meter
[1] Threshold is based on SCAQMD Rule 403. Since the SoCAB is in nonattainment for PM_{10} and $PM_{2.5}$, the threshold is established as an "allowable change" in concentration. Therefore, background concentration is irrelevant.

Health Risk Analysis

Whenever project activities would include the use of chemical compounds that have been identified in SCAQMD Rule 1401 relating to TACs, placed on CARB's TAC list pursuant to AB 1807, or placed on the EPA's National Emissions Standards for Hazardous Air Pollutants, a health risk assessment is required by the SCAQMD. Table 5.2-6 lists the SCAQMD's TAC incremental risk thresholds for operation of a project. Residential, commercial, and office uses do not use substantial quantities of TACs and these thresholds are typically applied for new industrial projects. A health risk assessments was not performed for stationary sources for the Modified Project because the Modified Project does not propose changes to the types of non-residential land uses identified by the Approved Project.

Table 5.2-6
SCAQMD Toxic Air Contaminants Incremental Risk Thresholds

Maximum Individual Cancer Risk	≥ 10 in 1 million
Cancer Burden	≥ 0.5 excess cancer cases (in areas ≥ 1 in 1 million)
Hazard Index (project increment)	≥ 1.0

Source: SCAQMD 2011

5.2.3 The Certified EIR

In analyzing the air quality related impacts of the originally approved 3,625 residential units and approximately 6.5 million square feet of non-residential uses, as modified by the Addenda, the Certified EIR used SCAQMD's CEQA Handbook methodologies and thresholds and identified the following conclusions regarding the air quality emissions.

AQMP Consistency: The Certified EIR concluded that the emissions from the residential and non-residential land uses would not impair SCAQMD's ability to meet NAAQS or CAAQS.

Construction-Related Regional Air Quality Impacts: The Certified EIR concluded that construction air emissions would be above the significance thresholds for VOC,[3] CO, NO_X and PM_{10}. It should be noted that there was no adopted threshold for $PM_{2.5}$ in 2003. The Certified EIR described the construction air impacts after mitigation as significant and unavoidable.

Operational Phase Regional Air Quality Impacts: The Certified EIR concluded that the operational emissions would exceed the significance thresholds for VOC, NO_X, CO, and PM_{10}, and would be significant after mitigation. Accordingly, the operational emissions were identified as a significant and unavoidable impact. No other construction- and operations-related significant air quality impacts were identified in the Certified EIR.

Localized Air Quality Impacts: The Certified EIR did not identify localized impacts (microscale) associated with CO hotspots generated by project-related vehicles at congested intersections. Since the time that the 2003 OCGP EIR was certified, SCAQMD has adopted localized significance thresholds for construction emissions.

Cumulative Impacts: The Certified EIR concluded that regional operational emissions of CO, VOC, and NO_x would be cumulatively considerable. No significant cumulative impacts were identified with regard to CO hot spots.

5.2.4 Environmental Impacts of the Modified Project

Modeling Methodology

Construction and operational phase emissions were calculated using the California Emission Estimator Model (CalEEMod) Version 2011.1.1, developed by SCAQMD. Localized air dispersion modeling was performed using the US Environmental Protection Agency's Industrial Source Complex 3 Short Term (ISC3ST) model. The analysis includes the following emission sources (see Appendix G for additional details regarding modeling methodology and assumptions):

- **Construction –**emissions associated with construction equipment, construction-related vehicle trips, and off-gas emissions from painting and paving. Construction emissions were based on the construction equipment information provided by the Applicant. The emissions have been adjusted from the CalEEMod output to account for the 33 percent reduction attributable to overestimation of load factors as indicated by CARB, as appropriate.
- **Operational Phase** – Area Sources: maximum daily emissions associated with landscape maintenance-related fuel combustion sources such as lawn mowers and from natural gas fireplaces. Based on information provided by the Applicant, 4,350 dwelling units were assumed to contain fireplaces under the Approved Project and the Modified Project.[4] Based on information provided by the Applicant, the landscape-related emissions for the Modified Project were reduced by 28 percent as compared to the Approved Project to account for the decrease in landscaped areas under the Modified Project.
- **Operational Phase** – Building Energy Use: maximum daily emissions associated with natural gas use in residential and non-residential buildings. The Approved Project and Modified Project emissions have been calculated using a Southern California Edison ("SCE") emission factor that accounts for the 33 percent renewable portfolio standard ("RPS") required by 2020. Building energy

[3] The Certified EIR used the term reactive organic gases (ROG) instead of VOC. However, for this purpose, the terms are synonymous.
4 Electrical fireplaces, if incorporated instead of natural gas fireplaces, would result in decreased criteria air pollutant emissions compared to a similar sized natural gas fireplace.

intensity was calibrated to account for updates in building energy efficiency since the 2001 Title 24 (California Building Code) standards (e.g., 2008 Building and Energy Efficiency Standards). The Modified Project's emissions also reflect the Applicant's commitment to build homes and non-residential buildings that are 15 percent more energy efficient than the standards set forth in the 2008 California Building and Energy Efficiency Standards (California Code of Regulations, Title 24, Part 6).

- **Operational Phase** – Mobile Sources: maximum daily emissions associated with daily operation of vehicles generated by the project in post-2030. Mobile-source emissions are based on the trip rates utilized in the traffic study prepared by Urban Crossroads (Appendix M), which are based on the ITAM, a travel-demand estimator. Fleet mix for the land uses is derived from SCAG's traffic model validation and ITE truck trip information. Passenger vehicle fleet mix is based on the Orange County fleet mix; however, the fleet mix for truck trips was assigned according to the SCAG model validation, where available. Reductions in vehicle miles traveled (VMT) are based on the California Air Pollution Control Officers Association's ("CAPCOA") Quantifying Greenhouse Gas Mitigation Measures for a "compact infill" and urban trip lengths, given that the Proposed Project Site is near an urban center and transit. Reductions are based on a density of 9.63 dwelling units per acre, more than 216 intersections per square mile, location no more than two miles from downtown or job center and no more than four miles from a transit center, inclusion of 544 below-market-rate units, and connecting pedestrian and bike paths within the Proposed Project Site and offsite. As a result, the Modified Project and Approved Project could result in over 30 percent reduction in vehicle miles traveled ("VMT"). However, according to the CAPCOA Manual, a limited number of case studies in Southern California described as compact infill show slightly lower levels of reductions. Therefore, to be conservative, it was only assumed that there would be a 25 percent reduction in VMT, which is within the range observed in Southern California.

Existing Plans, Programs, and Policies

The following measures are existing plans, programs, or policies ("PPP") that apply to both the Approved Project and the Modified Project and will help to reduce and avoid their respective potential impacts related to air quality:

PPP 2-1 **SCAQMD Rule 201 – Permit to Construct:** The SCAQMD requires developers who build, install, or replace any equipment or agricultural permit unit, which may cause new emissions of or reduce, eliminate, or control emissions of air contaminants to obtain a permit to construct from the Executive Officer.

PPP 2-2 **SCAQMD Rule 402 – Nuisance Odors:** The SCAQMD prohibits the discharge of any quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health or safety of any such persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property to be emitted within the SoCAB.

PPP 2-3 **SCAQMD Rule 403 – Fugitive Dust (PM_{10} and $PM_{2.5}$):** The SCAQMD prohibits any person to cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that: (a) the dust remains visible in the atmosphere beyond the property line of the emission source; or (b) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook) if the dust emission is the result of movement of a motorized vehicle.

PPP 2-4 **SCAQMD Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities:** This rule specifies work practice requirements to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of asbestos-containing materials (ACM). All operators are required to maintain records, including waste shipment records, and are required to use appropriate warning labels, signs, and markings.

PPP 2-5 **SCAQMD Rule 445 – Wood-Burning Devices:** SCAQMD prohibits installation of wood-burning devices such as fire places and wood-burning stoves in new development unless the development is located at an elevation above 3,000 feet or if existing infrastructure for natural gas service is not available within 150-feet of the development. All fireplaces installed within the Proposed Project Site will be natural gas fueled fireplaces.

Project Design Features

The following project design features ("PDFs") have been incorporated into the Modified Project and will help reduce or avoid its potential air quality impacts.

PDF 3-1 **Compact/Mixed-Use Development:** The California Energy Commission (CEC) considers compact development forms beneficial for minimizing energy consumption that leads to greenhouse gas emissions. In fact, the CEC's report on the connections between land use and climate change identifies density as the project feature most predictive of the number of vehicle trips and vehicle miles traveled ("VMT") by project occupants. The Modified Project increases the density of development on the Proposed Project Site as compared to the Approved Project, and locates additional housing opportunities near major employment and transportation centers. Doing so will tend to reduce VMT on a local and regional basis.

PDF 3-2 **High Rate of Internal Trip Capture:** With the inclusion of a mix of land uses including office, commercial, industrial, and residential in the Proposed Project Site, the Modified Project significantly reduces trips outside the Proposed Project Site. This reduces trip length and congestion on the local circulation system outside the Proposed Project Site.

PDF 3-7 **Energy Star Appliances:** EnergyStar appliances (excluding refrigerators), such as dishwashers, clothes washers, clothes dryers, air conditions, furnaces, and water heaters, shall be offered or installed in all residential dwelling units.

PDF 3-8 **Building Energy Efficiency:** Residential dwellings and non-residential buildings will be constructed so that they achieve 15 percent higher energy efficiency than the applicable standards set forth in the 2008 California Building and Energy Efficiency Standards (Title 24, Part 6 of the California Building Code).

The following impact analysis addresses impacts that the Initial Study disclosed as potentially significant impacts. The applicable potential impacts are identified in brackets after the impact statement.

IMPACT 5.2-1: THE MODIFIED PROJECT IS CONSISTENT WITH THE APPLICABLE AIR QUALITY MANAGEMENT PLAN. [IMPACT AQ-1]

Impact Analysis: The AQMP strategy is a macro-level analysis based on projections from local general plans. The land use designations of the Proposed Project Site are, in part, the foundation for the emissions inventory

for the SoCAB in the AQMP. The AQMP is based on projections in population, employment, and VMT in the SoCAB region as projected by SCAG.

The 2003 OCGP EIR concluded that that development of the originally approved 3,625 units and 6,585,594 square feet of non-residential uses was consistent with the then-applicable AQMP. SCAQMD's AQMP and SCAG's Regional Transportation Plan (RTP) have been revised since the 2003 OCGP EIR was certified. The most recent AQMP is SCAQMD's 2007 AQMP, which is based on the growth projections in SCAG's 2004 RTP. Therefore, the 2007 AQMP assumes growth projections that account for buildout of the level of development analyzed in the 2003 OCGP EIR. The most recent RTP is SCAG's 2008 RTP.

Table 5.2-7 compares the population, employment, and VMT of the Approved Project with those of the Modified Project. As shown in this table, the population, employment, and VMT for the Approved Project and for the Modified Project are the same. The only difference between the land uses assumed at the Proposed Project Site in the 2003 OCGP EIR and the Approved Project and the Modified Project is the inclusion of the 1,269 density bonus units, the grant of which was mandated by state law without the need to obtain a general plan amendment or zone change. Therefore, both the Approved Project and the Modified Project are consistent with the 2007 AQMP. Additionally, both the Approved Project and Modified Project are consistent with the 2007 AQMP because both further the objectives of SCAG's Regional Comprehensive Plan to increase residential density in close proximity to existing employment and transportation centers. Impacts would remain less than significant.

Table 5.2-7
Employment, Population, and VMT Generation Comparison

	Approved Project	*Modified Project*	*Difference between the Approved Project and Modified Project*
Population[1]	12,405	12,405	0
Employment[1]	16,510	16,510	0
Annual VMT[2]	237,731,108	237,731,108	0

Notes:
NA: Not available
[1] Population and employment are shown in Section 5.8, *Population and Housing*, of this DSEIR.
[2] VMT is based on air quality study prepared by ENVIRON (see Appendix G).

IMPACT 5.2-2: CONSTRUCTION EMISSIONS OF THE MODIFIED PROJECT WOULD, LIKE THE APPROVED PROJECT, EXCEED SCAQMD'S EMISSIONS THRESHOLDS FOR VOC, NO_X, CO, PM_{10}, AND $PM_{2.5}$. [IMPACT AQ-2 AND AQ-3]

Impact Analysis: Construction activities produce combustion emissions from various sources, such as onsite heavy-duty construction vehicles, vehicles hauling materials to and from the site, and motor vehicles transporting the construction crew. Site preparation activities produce fugitive dust emissions (PM_{10} and $PM_{2.5}$) from soil-disturbing activities such as grading and excavation. Exhaust emissions from construction activities onsite would vary daily as construction activity levels change. The Certified EIR concluded that construction air emissions would exceed the significance thresholds for VOC, CO, NO_X and PM_{10} and were identified as a significant unavoidable impact.

Construction mass criteria pollutant emissions associated with both the Approved Project and the Modified Project were calculated using CalEEMod and are reported in Table 5.2-8. Construction emissions for the

Approved Project and the Modified Project are essentially identical because both would result in the same disturbance area and a similar mix of construction equipment. During construction, for both the Approved Project and the Modified Project, mass criteria air pollutant emissions of SO_2 would be less than the applicable mass daily threshold, and are therefore, less than significant. Mass criteria air pollutant emissions of VOC, NO_x, CO, PM_{10}, and $PM_{2.5}$ would be greater than the applicable SCAQMD mass daily thresholds and are therefore significant.

Table 5.2-8
Maximum Daily Construction Emissions – Approved Project and Modified Project

Summary by Year	Maximum Daily Emissions (lbs/day)					
	VOC	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
2011	**76**	**734**	427	1	**1,472**	37
2012	74	**669**	392	1	**1,469**	34
2013	**363**	**815**	540	1	**1,281**	46
2014	**541**	**1,400**	**891**	2	**3,569**	**75**
2015	**241**	**540**	393	1	**1,301**	29
2016	**135**	**1,125**	**819**	2	**2,525**	**62**
2017	**665**	**2,252**	**1,595**	5	**9,204**	**114**
2018	**1,156**	**2,109**	**1,555**	5	**9,198**	**91**
2019	**957**	**1,137**	**850**	3	**4,460**	53
2020	**1,491**	**766**	**699**	2	**2,288**	37
2021	**1,209**	**112**	158	<1	13	5
SCAQMD Threshold	75	100	550	150	150	55

Source: ENVIRON 2011.
Notes: Construction emissions assume implementation of SCAQMD Rule 403 for fugitive dust control.
Bold = Exceeds SCAQMD Threshold

IMPACT 5.2-3: LONG-TERM OPERATION OF THE MODIFIED PROJECT WOULD, LIKE THE APPROVED PROJECT, EXCEED SCAQMD'S EMISSIONS THRESHOLDS FOR VOC, NO_X, CO, AND $PM_{2.5}$. [IMPACT AQ-2 AND AQ-3]

Impact Analysis: The Certified EIR concluded that the operational phase mass criteria pollutant emissions would exceed the significance thresholds for VOC, NO_X, CO, and PM_{10} and associated impacts would therefore be significant and unavoidable. As stated above, there was no adopted threshold for $PM_{2.5}$ in 2003. Emissions projections for the Approved Project and the Modified Project were compiled using CalEEMod. The results of the CalEEmod computer modeling are reported in Table 5.2-9. As shown in this table, the operational emissions for both the Approved Project and the Modified Project exceed the SCAQMD's thresholds for VOC, NO_x, CO, and $PM_{2.5}$. The operational emissions for both the Approved Project and the Modified Project do not exceed the SCAQMD's thresholds for PM_{10} and SO_2. As shown in Table 5.2-9, the level of operational emissions impacts for the Modified Project are the same or less than for the Approved Project.

Table 5.2-9
Maximum Daily Operational Phase Emissions

Summary	Maximum Daily Emissions (lbs/day) – Winter or Summer					
	VOC	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Approved Project						
Area	319	5	408	<1	8	8
Natural Gas	8	69	41	<1	6	6
Traffic	257	393	2,011	8	66	44
Total Approved Project	**584**	**467**	**2,460**	9	80	**57**
Exceeds Threshold?	**YES**	**YES**	**YES**	No	No	**YES**
Modified Project						
Area	315	3	294	<1	7	7
Natural Gas	7	61	36	<1	5	5
Traffic	257	393	22,011	8	44	44
Total Modified Project	**580**	**458**	**2,342**	8	79	**56**
Exceeds Threshold?	**YES**	**YES**	**YES**	No	No	**YES**
SCAQMD Threshold	55	55	550	150	150	55

Source: ENVIRON 2011.
Bold = Exceeds SCAQMD Threshold

IMPACT 5.2-4: CONSTRUCTION OF THE MODIFIED PROJECT WOULD NOT EXPOSE SENSITIVE RECEPTORS TO SIGNIFICANT AIR POLLUTANT CONCENTRATIONS. [IMPACT AQ-4]

Impact Analysis: The SCAQMD's LST methodology was developed to ensure that a development project would not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standards or to an increase of PM emissions in excess of the control requirement in SCAQMD Rule 403. SCAQMD recommends that construction projects larger than five acres model the CO, NO_2, PM_{10} and $PM_{2.5}$ emissions to determine if they are below the applicable ambient air quality thresholds. For pollutants in an attainment area (the SoCAB is classified as an attainment area for NO_2 and CO), SCAQMD suggests that the background concentrations be determined and added to the results of the air dispersion modeling to determine if ambient air standards would be violated.[5] For pollutants in a non-attainment area (the SoCAB is classified as a non-attainment area for PM_{10} and $PM_{2.5}$), SCAQMD has determined that concentrations estimated using the modeling guidance provided by SCAQMD to be below 10.4 $\mu g/m^3$ in a 24-hour averaging period will result in a less-than-significant impact as discussed in its LST guidance.

The Proposed Project Site is larger than five acres and the equipment list would allow for greater than five acres to be graded at one time. The only potential differences between the Approved Project and the Modified Project would occur during the vertical building construction phases. However, changing the types of buildings constructed on a specific acre would not alter the impacts since similar sized work areas have similar construction equipment lists, as supplied by the Applicant; and are therefore tied to acreage and not the types of buildings built on the acres. Regardless of where the density bonus units are placed, the same amount of demolition, site preparation, grading, and paving would occur. The only difference would be small variations in construction equipment associated with a change in the types of buildings constructed on specific acres (i.e., multi-family units vs. commercial buildings). This is unlikely to change emissions substantially, because equipment associated with building construction tends to have fewer pieces and to generate a lower level of emissions than equipment associated with excavation, grading and paving as indicated in the default

[5] SCAQMD. 2008. Final Localized Significance Threshold Methodology. Available at: http://www.aqmd.gov/ceqa/handbook/lst/lst.html.

construction equipment lists for the same acreage site and off-road emission factors in the CalEEMod User's Guide Appendix D (SCAQMD 2011). As a result, it is unlikely that any minor changes in construction due to a change in the types of buildings being constructed on the same amount of acreage would significantly alter the maximum air pollutant concentrations estimated for comparison to the LST (see Appendix G).

Dispersion modeling using the ISC3ST model was performed to determine maximum localized concentrations of CO, NO_x, PM_{10}, and $PM_{2.5}$ emissions at individual sensitive receptor locations nearest the Proposed Project Site boundaries. As the data in Table 5.2-10 and Figure 5.2-1, *Maximum Offsite Concentrations for Construction Emissions*, demonstrates, the Modified Project would not result in significant impacts on local air quality resulting from construction as determined by air dispersion modeling.

Table 5.2-10
Localized Construction Modeling

	CO 1-hr	CO 8-hr	NO_2 1-hr	PM_{10} 24-hr	$PM_{2.5}$ 24-hr
Background Concentration	2.9 ppm	2.2 ppm	0.08 ppm	NA	NA
Maximum Modeled Concentration	0.2 ppm	0.1 ppm	0.03 ppm	7.8 $\mu g/m^3$	8.0 $\mu g/m^3$
Combined Model & Background Concentration	3.1 ppm	2.3 ppm	0.11 ppm	NA	NA
SCAQMD Threshold	20 ppm	9 ppm	0.18 ppm	10.4 $\mu g/m^3$	10.4 $\mu g/m^3$
Exceeds Threshold	No	No	No	No	No

Source: ENVIRON 2011.
Notes: The threshold is the applicable AAQS except for PM, which is set to 10.4 $\mu g/m^3$ based on SCAQMD Rule 403.
NA = Not Applicable
Bold = Exceeds SCAQMD Threshold

IMPACT 5.2-5: THE MODIFIED PROJECT WOULD NOT EXPOSE SENSITIVE RECEPTORS TO ELEVATED CONCENTRATIONS OF CO AT INTERSECTIONS. [IMPACT AQ-4]

Impact Analysis: SCAQMD has adopted localized significance thresholds for onsite emissions. However, neither the Approved Project nor the Modified Project contains any of the land uses, such as industrial, manufacturing, and warehousing land uses, that require a localized significant threshold analysis for operational emissions to be performed under SCAQMD's LST methodology.

The Certified EIR did not identify any localized impacts (microscale) associated with CO hotspots generated by project-related vehicles at congested intersections.

ENVIRON determined that a carbon monoxide (CO) "hot spots" analysis is not needed to determine whether the change in the level of service (LOS) of an intersection in the Modified Project would have the potential to result in exceedances of the California or National Ambient Air Quality Standards (CAAQS or NAAQS).

It has long been recognized that CO exceedances are caused by vehicular emissions, primarily when idling at intersections. Accordingly, vehicle emissions standards have become increasingly more stringent. Before the first vehicle emission regulations, cars in the 1950's were typically emitting about 87 grams of CO per mile. Since the first regulation of CO emissions from vehicles (model year 1966) in California, vehicle emissions standards for CO applicable to light duty vehicles have decreased by 96% , for automobiles, and new cold weather CO standards have been implemented, effective for the 1996 model year. Currently, the CO standard in California is a maximum of 3.4 grams/mile for passenger cars (with provisions for certain cars to emit even

less). With the turnover of older vehicles, introduction of cleaner fuels and implementation of control technology on industrial facilities, CO concentrations in the SCAQMD have steadily declined, based on historical data from the El Toro monitoring station for the period from 1981 to 2000 and the Mission Viejo monitoring station for the period from 2000 to 2008.

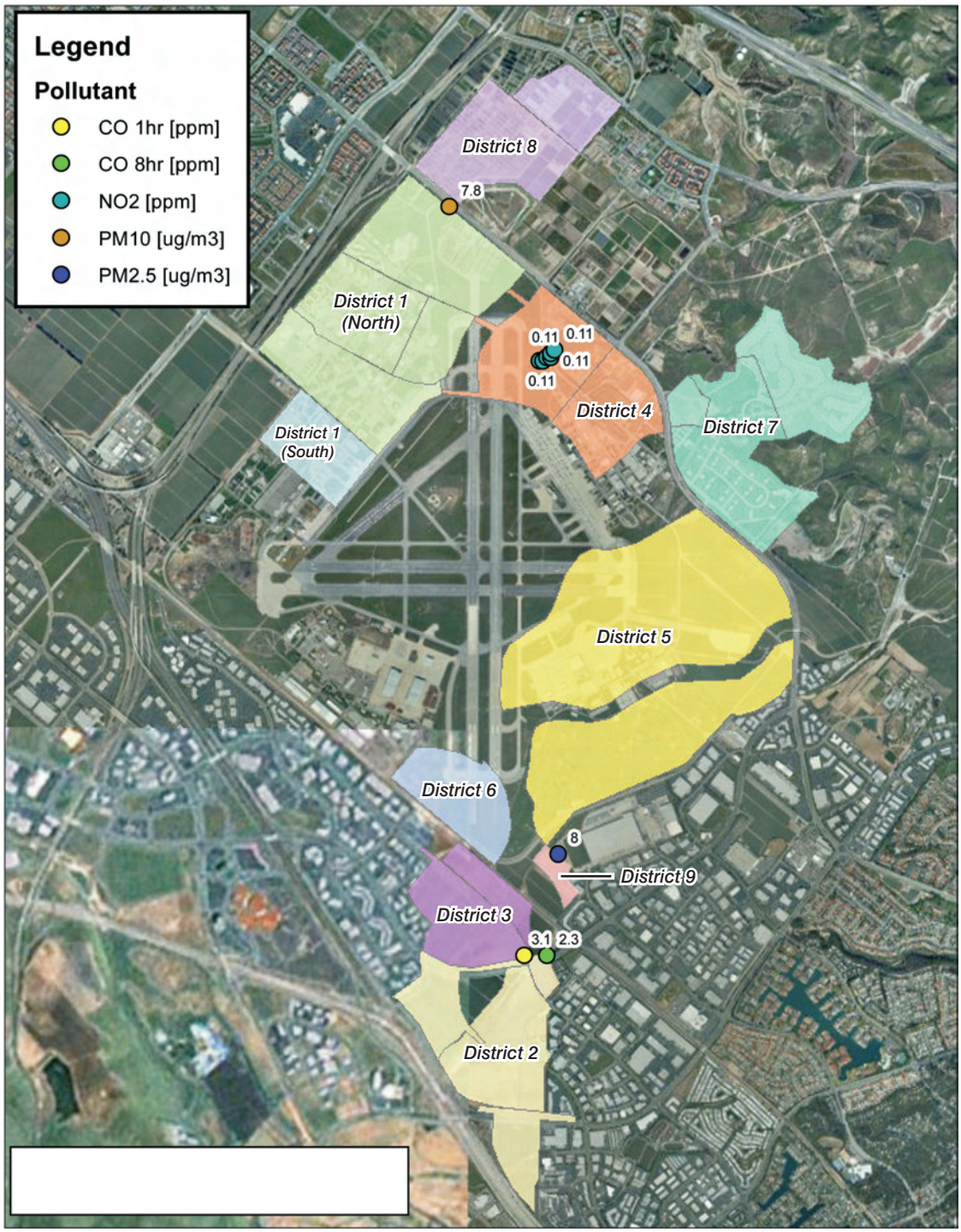
Accordingly, with the steadily decreasing CO emissions from vehicles, even very busy intersections do not result in exceedances of the CO standard.

The analysis prepared for CO attainment in the SoCAB by the SCAQMD can be used to assist in evaluating the potential for CO exceedances in the South Coast Air Basin. CO attainment was thoroughly analyzed as part of the SCAQMD's 2003 Air Quality Management Plan (2003 AQMP) and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan). As discussed in the 1992 CO Plan, peak carbon monoxide concentrations in the South Coast Air Basin are due to unusual meteorological and topographical conditions, and not due to the impact of particular intersections. Considering the region's unique meteorological conditions and the increasingly stringent CO emissions standards, CO modeling was performed as part of 1992 CO Plan and subsequent plan updates and air quality management plans.

In the 1992 CO Plan, a CO hot spot analysis was conducted for four busy intersections in Los Angeles at the peak morning and afternoon time periods. The intersections evaluated included: Long Beach Blvd. and Imperial Highway (Lynwood); Wilshire Blvd. and Veteran Ave. (Westwood); Sunset Blvd. and Highland Ave. (Hollywood); and La Cienega Blvd. and Century Blvd. (Inglewood). These analyses did not predict a violation of CO standards. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which has a daily traffic volume of approximately 100,000 vehicles per day. The Los Angeles County Metropolitan Transportation Authority evaluated the LOS in the vicinity of the Wilshire Blvd./Veteran Ave. intersection and found it to be Level E at peak morning traffic and Level F at peak afternoon traffic.

At buildout of the Modified Project, the highest number of average daily trips would be 71,000 for Bake Parkway south of Rockfield Boulevard, which is lower than the values studied in the 1992 CO Plan. Consequently at buildout of the Modified Project, according to the Great Park Neighborhoods GPA/ZC Traffic Impact Analysis (Appendix M), none of the intersections in the vicinity of the Proposed Project Site would have peak hourly traffic volumes exceeding those at the intersections modeled in the 2003 AQMP, nor would there be any reason unique to SoCAB meteorology to conclude that this intersection would yield higher CO concentrations if modeled in detail. As a result, the SoCAB has been designated as attainment for CO since 2007 (SCAQMD 2007) and even very busy intersections do not result in exceedances of the CO standard.

Maximum Offsite Concentrations for Construction Emissions



Source: ENVIRON

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5.2.5 Cumulative Impacts

In accordance with the SCAQMD's *CEQA Air Quality Analysis Handbook*, any project that produces a significant project-level regional air quality impact in an area that is in nonattainment adds to the cumulative impact. Cumulative projects within the local area include buildout consistent with the City of Irvine General Plan, projects under construction, and approved projects (refer to Chapter 4, *Environmental Setting*). The greatest source of emissions within the SoCAB is from mobile sources. Due to the extent of the area potentially impacted from cumulative project emissions, the SCAQMD considers a project cumulatively significant when project-related emissions exceed the SCAQMD regional emissions thresholds shown in Table 5.2-4 (SCAQMD 1993).

Construction

The SoCAB is designated nonattainment for O_3, PM_{10}[6], $PM_{2.5}$, and lead (Los Angeles County only) under the California and national AAQS, and nonattainment for NO_2under the California AAQS. Construction of cumulative projects will further degrade the regional air quality. Already-imposed mitigation measures from the Certified EIR, as well as PPPs and PDFs specified for the Modified Project will assist in mitigating these cumulative impacts and PPPs can be applied to all similar cumulative projects. However, even with the implementation of mitigation measures, PPPs, and PDFs, the Modified Project's construction emissions would still exceed the SCAQMD significance thresholds for VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$. Therefore, as is the case for the Approved Project, the Modified Project's contribution to cumulative air quality impacts would be significant.

Operation

For operational air quality emissions, any project that does not exceed or can be mitigated to less than the daily regional threshold values is not considered by the SCAQMD to be a substantial source of air pollution and does not add significantly to a cumulative impact. As discussed above, operation of both the Approved Project and the Modified Project would result in emissions in excess of the SCAQMD regional daily emissions thresholds for VOC, NO_X, CO, and $PM_{2.5}$. Therefore, both the Approved Project's and the Modified Project's contribution to cumulative air quality impacts would be significant.

5.2.6 Level of Significance Before Mitigation

Upon implementation of regulatory requirements and standard conditions of approval, the following impacts would be less than significant for the Modified Project: 5.2-1, 5.2-4, and Impact 5.2-5.

Upon implementation of regulatory requirements and standard conditions of approval, the following impacts would be significant: 5.2-2 and 5.2-3.

[6] CARB approved the SCAQMD's request to redesignate the SoCAB from serious nonattainment for PM_{10} to attainment for PM_{10} under the National AAQS on March 25, 2010 because the SoCAB has not violated federal 24-hour PM_{10} standards during the period from 2004 to 2007. However, the USEPA has not yet approved this request.

5.2.7 Mitigation Measures

Applicable Mitigation Measures from the Certified EIR

The following mitigation measures were included in the Certified EIR. These mitigation measures are also included in the Modified Project, and have been renumbered for the purposes of this DSEIR. This DSEIR proposes to make certain modifications to the mitigation measures adopted by the City for the Approved Project. Modifications to the original mitigation measures are identified in ~~strikeout text~~ to indicate deletions and underlined to signify additions. The modifications are being proposed in order to account for the latest improvements in emission control technologies and updated SCAQMD recommendations for reducing air pollutant emissions.

Construction Phase

AQ1 Prior to the start of demolition and construction within the project area, adjacent sensitive receptors shall be informed of the planned demolition and construction activities. Measures to avoid significantly impacting these receptors shall be developed and implemented by the project proponent in coordination with these uses. Other applicable mitigation measures such as erection of fences around construction areas; staggered use of equipment near sensitive receptors; diversion of truck trips away from receptors; etc.; shall be employed as necessary. Compliance with this measure shall be verified by the Director of Community Development.

AQ2 Prior to the commencement of construction activities required to demolish and/or remove existing DON structures, including runways, the Director of Community Development shall receive and approve a construction emissions mitigation plan from the chosen demolition contractor. Prior to the issuance of grading permits, the applicant of any future development project shall submit, and the Director of Community Development shall approve a construction emissions mitigation plan. The plan shall identify implementation procedures for each of the following emissions reduction measures and all feasible mitigation measures shall be implemented. If certain measures are determined infeasible, an explanation thereof shall be provided.

- ~~Evaluate the availability and use, if available, of low-emission (i.e., methanol- or natural gas-powered) construction equipment instead of diesel for each construction phase.~~

- Utilize off-road construction equipment that conforms to Tier 3 of the United States Environmental Protection Agency, or higher emissions standards for construction equipment over 50 horsepower that are commercially available. The construction contractor shall be made aware of this requirement prior to the start of construction activities. Use of commercially available Tier 3 or higher off-road equipment, which is:

    - Year 2006 or newer construction equipment for engines rated equal to 175 horsepower (hp) and greater;

    - Year 2007 and newer construction equipment for engines rated equal to 100 hp but less than 175 hp; and

    - Year 2008 and newer construction equipment for engines rated equal to or greater than 50 hp but less than 100 hp.

The requirement to use such equipment shall be stated on all grading plans. The construction contractor shall maintain a list of all operating equipment in use on the project site. The construction equipment list shall state the makes, models, and numbers of construction equipment on-site.

- Water exposed soils at least ~~twice~~ three times daily and maintain equipment and vehicle engines in good condition and in proper tune.
- Wash off trucks leaving the site.
- Replace ground cover on construction sites when it is determined that the site will be undisturbed for lengthy periods.
- Reduce speeds on unpaved roads to less than 15 miles per hour.
- Halt all grading and excavation operations when wind speeds exceed 25 miles per hour.
- Suspend all emission generating activities during smog alerts.
- Use propane- or butane-powered on-site mobile equipment instead of diesel/gasoline, whenever feasible.
- Properly maintain diesel-powered on-site mobile equipment.
- Prohibit nonessential idling of construction equipment to five minutes or less in compliance with California Air Resources Board's Rule 2449.
- Sweep streets with SCAQMD Rule 1186 compliant PM_{10}-efficient vacuum units at the end of the day if substantial visible soil material is carried over to the adjacent streets.
- Use electricity from power poles rather than temporary on-site diesel- or gasoline-powered generators, whenever feasible.
- Use of low-VOC asphalt.
- Maintain a minimum 24-inch freeboard on trucks hauling dirt, sand, soil, or other loose materials and tarp materials with a fabric cover or other suitable means. ~~Cover all trucks hauling dirt, sand, soil or other loose material to and from the site.~~
- Provide temporary traffic controls (e.g., flag persons) during all phases of construction to ensure minimum disruption of traffic.
- Schedule construction activities that affect traffic flow on adjoining streets to off-peak hours to the extent possible.
- Reroute construction trucks away from congested streets, whenever feasible.

- Provide dedicated turn lanes for movement of construction trucks and equipment on- and off-site, whenever feasible.

- Use coatings and solvents with a volatile organic compound (VOC) content lower than required under SCAQMD Rule 1113 (i.e., Super Compliant Paints). All architectural coatings shall be applied either by (1) using a high-volume, low-pressure spray method operated at an air pressure between 0.1 and 10 pounds per square inch gauge to achieve a 65 percent application efficiency; or (2) manual application using a paintbrush, hand-roller, trowel, spatula, dauber, rag, or sponge, to achieve a 100 percent applicant efficiency. The construction contractor shall also use precoated/natural colored building, where feasible. Use of low-VOC paints and spray method shall be included as a note on architectural building plans.

Operational Phase

AQ3 Prior to the issuance of building permits for any future development, the applicant shall submit, and Director of Community Development shall have approved, an operation-emissions mitigation plan. The plan shall identify implementation procedures for each of the following emissions reduction measures and all feasible mitigation measures shall be implemented. If certain measures are determined infeasible, an explanation thereof shall be provided.

- Utilize built-in energy-efficient appliances to reduce energy consumption and emissions.

- Utilize energy-efficient and automated controls for air conditioners and lighting to reduce electricity consumption and associated emissions.

- Install special sunlight-filtering window coatings or double-paned windows to reduce thermal loss, whenever feasible.

- Utilize light-colored roofing materials as opposed to dark roofing materials to conserve electrical energy for air-conditioning.

- Provide shade trees in residential subdivisions as well as public areas, including parks, to reduce building heating and cooling needs, whenever feasible.

- Ensure that whenever feasible, commercial truck traffic is diverted from local roadways to off-peak periods.

- Centralize space heating and cooling for multiple-family dwelling units and commercial space.

- Orient buildings north/south for reducing energy-related combustion emissions.

- Use solar energy, when feasible.

- Use high rating insulation in walls and ceilings.

AQ4 Prior to the issuance of building permits, ~~At the time of residential and commercial lease and sales agreements,~~ future sales information on available housing and employment opportunities

within the project area shall be provided to employees and residents of the project area, so as to encourage employees to live within the residential developments planned on-site and future residents to find employment nearby.

AQ5 Prior to the issuance of building permits, ~~At the time of residential and commercial lease and sales agreements,~~ the applicant shall demonstrate to the satisfaction of the Director of Community Development that future employment generating nonresidential development shall include measures to reduce vehicle trips including: the promotion of carpool incentives and alternative work schedules, easy access to public transit systems, trail linkages between uses, low emissions vehicles fleets, and the provision of on-site facilities such as banking and food courts, and bicycle parking facilities, and other transportation demand management measures, as deemed appropriate.

Additional Mitigation Measures for the Modified Project

No additional mitigation measures are identified that would reduce construction and operational air pollutant emissions to less than significant levels.

5.2.8 Level of Significance After Mitigation

Impact 5.2-2

Like the Approved Project, the Modified Project would result in significant and unavoidable short-term construction air quality impacts due to emissions of VOC, NO_x, CO, PM_{10} and $PM_{2.5}$. PPPs 2-1 through 2-4 and Mitigation Measures AQ-1 and AQ-2 would reduce construction emissions to the extent feasible. However, Impact 5.2-2 would remain significant and unavoidable even after mitigation.

Impact 5.2-3

Like the Approved Project, long-term operation of the Modified Project would result in significant and unavoidable impacts due to emissions of VOC, NO_X, CO, and $PM_{2.5}$. PPP 2-5, PDFs 3-1, 3-2, 3-7, and 3-8, and Mitigation Measures AQ-3 through AQ-5 would reduce operational phase air quality impacts to the extent feasible. However, Impact 5.2-3 would remain significant and unavoidable even after mitigation.

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