5. Environmental Analysis

5.1 AIR QUALITY

5.1.1 Environmental Setting

This section of the Shea/Baker Ranch Draft Supplemental EIR (DSEIR) evaluates the potential for the project to impact air quality in the local and regional context.

The City of Lake Forest determined it was necessary to prepare a DSEIR for this project. The OSA PEIR requires evaluation of individual project-level construction and operational level emissions when site-specific entitlements are submitted. While the OSA PEIR previously found both short- and long-term air quality impacts to be significant and unavoidable, it did not fully quantify air quality impacts at a construction level of detail. Furthermore, since the certification of the OSA PEIR, the South Coast Air Quality Management District (SCAQMD) has identified thresholds of significance for $PM_{2.5}$. Accordingly, a project-level air quality analysis has been prepared for the SBRA Project. This project-level analysis is considered new information pursuant to CEQA Guidelines Section 15162(a)(3)(A). The DSEIR evaluates this new information to determine if it results in new potentially significant impacts. The analysis in this section is based on the following technical report:

- *Shea Baker Ranch* Air *Quality Analysis*, LSA, December 2011.

This study is included in the Technical Appendices to this DSEIR (Appendix C).

South Coast Air Basin

The project site lies within the South Coast Air Basin (SoCAB), which includes all of Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino Counties. The air basin 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 semipermanent 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 site is the Tustin Irvine Ranch Station. The average low is reported at 40.2°F in January and the average high is 85.2°F in August (WRCC 2012). In contrast to the very steady temperature pattern, 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 in the project area averages approximately 12.86 inches per year, as measured in the project vicinity (WRCC 2012).

Humidity

Although the SoCAB has a semiarid 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 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 project area.

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 known as "criteria air pollutants" and are categorized into primary and 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), particulate matter (PM_{10}), $PM_{2.5}$, and lead (Pb) are primary air pollutants. Of these, CO, SO_2, NO_x, PM_{10}, and $PM_{2.5}$ are criteria pollutants. VOC and NO_x are criteria pollutant precursors and go on to 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.

Presented below is a description of each of the primary and secondary criteria air pollutants and their known health effects. Other pollutants, such as carbon dioxide (CO_2), have been linked to such phenomena as global climate change. 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 Section 5.2, *Greenhouse Gas Emissions*.

Carbon Monoxide (CO) is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. CO is a primary criteria air pollutant. CO concentrations tend to be the highest during winter mornings with little to no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines and motor vehicles operating at slow speeds are the primary source of CO in the SoCAB, the highest ambient CO concentrations are generally found near congested transportation corridors and intersections. 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). The SoCAB is designated under the California and national AAQS as attainment for CO.

Nitrogen Dioxide (NO_2) is a byproduct of fuel combustion and contributes to the formation of O_3, PM_{10}, and $PM_{2.5.}$ The principle form of NO_2 produced by combustion is nitric oxide (NO), but NO reacts quickly to form NO_2, creating the mixture of NO and NO_2 commonly called nitrogen oxides (NO_x). Thus, NO_x is both a primary and secondary air pollutant. NO_x absorbs blue light and reflects brown/red light; the results are a brownish-red cast to the atmosphere and reduced visibility. 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) (SCAQMD 2005).The SoCAB is designated as an attainment area for NO2 under the national AAQS and nonattainment under the California AAQS.

Ozone (O_3) is commonly referred to as "smog" and is a gas that is formed when volatile organic compounds (VOCs) and NO_x, both by-products of internal combustion engine exhaust, undergo photochemical reactions in the presence of sunlight. O_3 is a secondary criteria air pollutant. O3 concentrations are generally highest during the summer months when direct sunlight, light winds, and warm temperatures create favorable conditions for the formation of this pollutant. O_3 poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. Additionally, O3 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). The SoCAB is designated as extreme nonattainment under the California 1-hour and 8-hour AAQS and Extreme nonattainment under the national 8-hour AAQS.

Volatile organic compounds (VOCs), also known as reactive organic gases, are compounds comprised primarily of atoms of hydrogen and carbon. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. VOCs are also released from the out-gassing of paints and surface coatings such as asphalt. Adverse effects on human health are not caused directly by VOCs, but rather by reactions of VOCs to form secondary air pollutants, including O_3. There are no AAQS established for VOCs. However, because they contribute to the formation of O_3, the SCAQMD has established a significance threshold for this pollutant. Adverse effects on human health are not caused directly by VOC, but rather by reactions of VOC to form secondary pollutants such as ozone (SCAQMD 2005).

Particulate Matter (PM_{10} and $PM_{2.5}$) consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Coarse particles (all particles less than or equal to 10 micrometers in diameter, or PM_{10}) are derived from a variety of sources, including windblown dust and construction activities. Fuel combustion and resultant exhaust from power plants and diesel buses and trucks are primarily responsible for fine particles (less than 2.5 microns in diameter, or $PM_{2.5}$). Fine particles can also be formed in the atmosphere through chemical reactions. Particulate matter of 10 microns or smaller pose a health concern because they

can accumulate in the respiratory system and aggravate health problems such as asthma. The EPA's scientific review concluded that $PM_{2.5}$, which penetrates deeply into the lungs, is more likely than PM_{10} to contribute to health effects and at concentrations that extend well below those allowed by the current PM_{10} standards. These health effects include premature death and increased hospital admissions and emergency room visits (primarily the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (children and individuals with cardiopulmonary disease such as asthma); decreased lung functions (particularly in children and individuals with asthma); and alterations in lung tissue and structure and in respiratory tract defense mechanisms. Diesel particulates (DPM) are also classified by the California Air Resources Board (CARB) as a carcinogen. The SoCAB is a nonattainment area for the California and national AAQS for $PM_{2.5}$ and designated as attainment/maintenance under the national AAQS for PM10 and nonattainment under the California AAQS for PM_{10}.

Sulfur dioxide (SO_2) is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high-sulfur-content fuel oils and coal and from chemical processes at chemical plants and refineries. When sulfur dioxide oxidizes in the atmosphere, it forms sulfates (SO_4). Together, these pollutants are referred to as sulfur oxides (SO_x). Thus, SO_2 is both a primary and secondary criteria air pollutant. 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 SO2 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). The SoCAB is designated as attainment under the California and national AAQS.

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 SO_2 during the combustion process and subsequently is 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. The entire Basin is in attainment for the State standard for sulfates.

Lead (Pb) is a primary criteria air pollutant. Lead concentrations once exceeded the state and federal air quality standards by a wide margin, but have not exceed the state or federal air quality standards at any regular monitoring station since 1982 due to the phase out of leaded fuels. Consequently, the SoCAB has been designated as attainment under the California and national AAQS (SCAQMD 2005) and the project area. However, the Los Angeles County portion is designated as nonattainment under the California AAQS, because of large industrial emitters.

Toxic Air Contaminants

The public's exposure to 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 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 subsection (b) of Section 112 of the federal Clean Air Act (42 United Sates code Section 7412[b]) is a toxic air contaminant. Under state law, the California EPA, acting through CARB, is authorized to identify a substance as a TAC if it determines 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 the Tanner Air Toxics Act (California Health & Safety Code section 39650 et seq.) and Air Toxics "Hot Spot" Information and Assessment Act of 1987(Health and Safety Code Section 44300 et seq.). 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 (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. CARB has, to date, 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.

By the last update to the TAC list in December 1999, CARB had 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 the diesel exhaust were considered 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 2008, the SCAQMD conducted its third update to their 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 a million. The largest contributor to this risk was diesel exhaust, accounting for approximately 84 percent of the air toxics risk (SCAQMD 2008).

Regulatory Framework

Development of the project has the potential to release gaseous emissions of criteria pollutants and dust into the ambient air; therefore, it falls under the ambient air quality standards promulgated at the local, state, and federal levels. The project site is in the SoCAB and is subject to the rules and regulations imposed by the SCAQMD. However, the SCAQMD reports to CARB, and all criteria emissions are also governed by the California AAQS as well as the national AAQS. Federal, state, regional, and local laws, regulations, plans, or guidelines that are potentially applicable to the project are summarized below.

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 national AAQS 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 California AAQS by the earliest practical date. The California AAQS tend to be more restrictive than the national AAQS and are based on even greater health and welfare concerns.

These national AAQS and California AAQS standards 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 the State of California and the federal government have established health-based AAQS for seven air pollutants. As shown in Table 5.1-1, 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 5.1-1
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)	Annual Average	*	0.03 ppm	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	*	
	24 hours	0.04 ppm	0.14 ppm	
Suspended Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	*	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 $\mu g/m^3$	150 $\mu g/m^3$	
Suspended Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$	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 $\mu g/m^3$	
Lead (Pb)	Monthly	1.5 $\mu g/m^3$	*	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	*	1.5 $\mu g/m^3$	
	3-Month Average	*	0.15 $\mu g/m^3$	
Sulfates (SO_4)	24 hours	25 $\mu g/m^3$	*	Industrial processes.

Source: CARB 2010.
ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter
* 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 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 a bump-up (i.e., 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 included in Table 5.1-2.

The SoCAB is also designated as attainment of the California AAQS for SO_2, lead, 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 California AAQS, and attainment/maintenance for PM_{10} under the national AAQS.

Table 5.1-2
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[3]
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Attainment[4]
NO_2	Nonattainment[5]	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Attainment[6]	Attainment[6]
Sulfates	Attainment	Attainment
All others	Attainment/Unclassified	Attainment/Unclassified

Source: CARB 2011.
[1] Under prior standard.
[2] SCAQMD may petition for Extreme Nonattainment designation.
[3] Annual Standard Revoked September 2006. SCAQMD submitted a request to redesignate the SoCAB from serious nonattainment for PM_{10} to attainment for PM_{10} in October 2009 because the SoCAB has not violated federal 24-hour PM_{10} standards during the period from 2004 to 2007.
[4] The USEPA 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 as of June 11, 2007.
[5] The state NO_2 standard was strengthened in 2007 from 0.25 ppm to 0.18 ppm. Under the revised standards, the entire SoCAB was designated as 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 as nonattainment for lead under the new NAAQS and existing CAAQS as a result of large industrial emitters. Remaining areas within the SoCAB are unclassified. (March 25, 2010)

Existing Ambient Air Quality

SCAQMD, together with CARB, maintains ambient air quality monitoring stations in the SoCAB. The air quality monitoring station closest to the site is the Mission Viejo station, and its air quality trends are representative of the ambient air quality in the project area. As the Mission Viejo Station does not monitor NO_2 and SO_2 concentrations, the data from the Costa Mesa Station was used for this analysis. The pollutants monitored are CO, O_3, PM_{10}, $PM_{2.5}$, NO_2, and SO_2.

The ambient air quality data in Table 5.1-3 show that NO_2, SO_2, and CO levels are below the applicable State and federal standards. The State 1-hour O_3 standard was exceeded 5–9 times per year in the past 3 years. The federal 8-hour O_3 standard was exceeded 5–15 times per year in the past 3 years, and the State 8-hour O_3 standard was exceeded 10–25 times per year in the past 3 years. The State 24-hour PM_{10} standard was exceeded 0–3 times in the past 3 years, but the federal 24-hour standard was not exceeded. The federal 24-hour $PM_{2.5}$ standard was exceeded 0–2 days per year in the past 3 years. The State annual average $PM_{2.5}$ standard has not been exceeded in the past 2 years.

Table 5.1-3
Ambient Air Quality Monitored at Mission Viejo and Costa Mesa Stations

Pollutant	Standard	2007	2008	2009
Carbon Monoxide (CO) – from Mission Viejo Station				
Maximum 1-hr concentration (ppm)		2.9	1.5	1.4
Number of days exceeded:	State: > 20 ppm	0	0	0
	Federal: > 35 ppm	0	0	0
Maximum 8-hr concentration (ppm)		2.2	1.1	1.0
Number of days exceeded:	State: ≥ 9.0 ppm	0	0	0
	Federal: ≥ 9 ppm	0	0	0
Ozone (O_3) – from Mission Viejo Station				
Maximum 1-hr concentration (ppm)		0.108	0.118	0.121
Number of days exceeded:	State: > 0.09 ppm	5	9	7
Maximum 8-hr concentration (ppm)		0.090	0.104	0.095
Number of days exceeded:	State: > 0.07 ppm	10	25	14
	Federal: > 0.075 ppm	51	15	10
Coarse Particulates (PM_{10}) – from Mission Viejo Station				
Maximum 24-hr concentration ($\mu g/m^3$)		74	42	56
Number of days exceeded:	State: > 50 μg/m3	3	0	1
	Federal: > 150 μg/m3	0	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		ND2	ND	23.2
Exceeded for the year:	State: > 20 $\mu g/m^3$	ND	ND	Yes
Fine Particulates ($PM_{2.5}$) – from Mission Viejo Station				
Maximum 24-hr concentration ($\mu g/m^3$)		46.8	32.6	39.2
Number of days exceeded:	Federal: > 35 $\mu g/m^3$	23	0	1
Annual arithmetic average concentration ($\mu g/m^3$)		ND	10.3	9.4
Exceeded for the year:	State: > 12 μg/m3	ND	No	No
	Federal: > 15 μg/m3	ND	No	No
Nitrogen Dioxide (NO_2) – from Costa Mesa Station				
Maximum 1-hr concentration (ppm)		0.074	0.081	0.065
Number of days exceeded:	State: > 0.18 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.013	0.013	0.013
Exceeded for the year:	State: > 0.030 ppm	No	No	No
	Federal: > 0.053 ppm	No	No	No
Sulfur Dioxide (SO_2) – from Costa Mesa Station				
Maximum 24-hr concentration (ppm)		0.004	0.003	0.004
Number of days exceeded:	State: > 0.04 ppm	0	0	0
	Federal: > 0.14 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.000	0.001	0.001
Exceeded for the year:	Federal: > 0.030 ppm	No	No	No

Sources: LSA 2011. EPA and CARB websites: www.epa.gov/air/data/index.html and www.arb.ca.gov/adam/welcome.html (full 2010 data not yet available).
[1] The exceedances of the federal 8-hour O_3 standard are based on the old 0.08 ppm standard. In April 2008, the EPA revised the standard to 0.075 ppm.
[2] No data available.
[3] The exceedances of the federal 24-hour $PM_{2.5}$ standard are based on the old 65 $\mu g/m^3$ standard. In 2006, the EPA revised the standard to 35 $\mu g/m^3$.
$\mu g/m^3$ = micrograms per cubic meter
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
ppm = parts per million

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, since 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.

Summary of Relevant Analysis in the OSA PEIR

- **Construction-Related Regional Air Quality Impacts:** Construction emissions were not quantified in the OSA PEIR. Detailed construction information such as grading volumes, construction phasing, and construction equipment mix was not known at the time. The PEIR assumed that the larger OSA projects could have a significant construction related emissions because individual projects were expected to exceed SCAQMD thresholds from clearing, grading and construction activities (fugitive dust and construction exhaust, including diesel). The OSA PEIR required evaluation of individual project-level construction and operational level emissions when site-specific entitlements are submitted. Mitigation measures were included to reduce construction emissions in accordance with SCAQMD policies. (OSA PEIR Impact 3.3-3, Section 3.3)

- **Operational Phase Regional Air Quality Impacts**: The OSA PEIR identified that operational phase emissions would exceed SCAQMD thresholds for CO, VOC, coarse inhalable PM_{10}, and NO_X. These conclusions were based on a programmatic screening level analysis. Regional operational air quality modeling in the OSA PEIR was performed using the URBEMIS2002 model. The screening level analysis was based the maximum development assumed for the site at the time, since the individual project details of each OSA site was unknown. The OSA PEIR required evaluation of individual project-level construction and operational level emissions when site-specific entitlements are submitted. The California Air Resources Board (CARB) has since updated emission factors, which were integrated into the new model, CalEEMod. Mitigation measures were incorporated into the EIR; however, impacts remained significant and avoidable. In 2006, after the release of the Notice of Preparation, the U.S. Environmental Protection Agency (EPA) adopted ambient air quality standards for fine inhalable particulate matter ($PM_{2.5}$). Therefore, at the time of preparation, SCAQMD had not adopted thresholds for $PM_{2.5}$. In addition, regional operational air quality modeling in the OSA PEIR was performed using the URBEMIS2002 model. However, CARB's updated emission factors were integrated in the new model, CalEEMod, which was released by SCAQMD in 2011. (OSA Impact 3.3-3)

- **Localized Air Quality Impacts:** The OSA PEIR did not identify localized impacts (microscale) associated with CO hotspots generated by project-related vehicles at congested intersections. Since the OSA PEIR, SCAQMD has also adopted localized significance thresholds for onsite emissions. (OSA PEIR Impact 3.3-2, Section 3.3)

- **Cumulative Impacts**: The OSA PEIR identified that regional operational emissions of CO, VOC, and ozone would be cumulatively considerable. No significant cumulative impacts were identified with regard to CO hot spots. (OSA PEIR Impact 3.3-4, Section 3.3)

Methodology

The air quality evaluation was prepared in accordance with the requirements of the California Environmental Quality Act (CEQA) to determine if significant air quality impacts are likely to occur in conjunction with the type and scale of development associated with the SBRA Project. SCAQMD has published the *CEQA Air Quality Handbook* (Handbook) and posted updates included on its website, these are intended to provide local governments with guidance for analyzing and mitigating project-specific air quality impacts. This Handbook provides standards, methodologies, and procedures for conducting air quality analyses in environmental impact reports and was used extensively in the preparation of this analysis. In addition, the SCAQMD has published two additional guidance documents: *Localized Significance Threshold Methodology for CEQA Evaluations* (2003) and *Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology* (2006), which are intended to provide guidance in evaluating localized effects from mass emissions during construction. These documents were also used in the preparation of this analysis.

The Handbook with associated updates and the City of Lake Forest CEQA Significance Thresholds Guide, dated November 20, 2001 (revised March 2009), were adhered to in the assessment of air quality impacts for the SBRA Project. The air quality models identified in the City's document (including an older version of the URBEMIS model) are outdated; therefore, the current model, CalEEMod Version 2011.1.1, was used to estimate project-related mobile and stationary sources emissions.

This analysis includes estimated emissions associated with short-term construction and long-term operation of the SBRA Project. Criteria pollutants with regional impacts would be emitted by project-related vehicular trips, as well as by emissions associated with stationary sources used on site. Localized air quality impacts, i.e., higher CO concentrations (CO hot spots) near intersections or roadway segments in the project vicinity, would be small and less than significant due to the generally low ambient CO concentrations (3.8 ppm for the 1-hour period and 2.9 ppm for the 8-hour period) in the project area.

The net increase in pollutant emissions determines the significance and impact on regional air quality as a result of the SBRA Project. The results also allow the local government to determine whether the SBRA Project will deter the region from achieving the goal of reducing pollutants in accordance with the AQMP in order to comply with federal and State ambient air quality standards (AAQS).

5.1.2 Project Design Features

The following Project Design Features (PDFs) have been included in the Area Plan for the proposed SBRA Project, and reduce potential air quality emissions by reducing energy consumption and promoting alternative forms of transportation:

AQ PDF-1 The applicant shall use "Green Building Materials," such as those materials that are rapidly renewable or resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project, as defined on the CalRecycle website, to the satisfaction of the Director of Development Services.

AQ PDF-2 The applicant shall incorporate the following design features into the project. These design features shall be identified on building plans:

- Low emission water heater, or solar water heaters shall be installed.
- Exterior windows shall include window treatments for efficient energy conservation.
- Water efficient fixtures and builder-provided appliances shall be water-efficient (low-flow, duel flush toilets) and shall reduce indoor water consumption by 20 percent from the Building Standard Code from baseline water consumption.
- A home-owner's manual shall be provided for each residence that describes operation and maintenance of equipment, appliances, drainage, space conditioning, irrigation, and water reuse systems installed.

AQ PDF-3 Buildings shall be constructed to achieve the voluntary Tier 1 California Green Building Code (CALGreen) standards. In accordance with the current Tier 1 standards, project buildings shall exceed the 2008 Building and Energy Standards by 15 percent. Building envelope improvements to achieve this standard may include:

- Increased insulation, such that heat transfer and thermal bridging is minimized.
- Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption.
- Energy-Star rated windows, space heating and cooling equipment, appliances, or other applicable electric equipment.
- Install efficient lighting and offer lighting control systems as an option.
- Use daylight as an integral part of the lighting system in buildings.
- Install energy-efficient HVAC systems, appliances, equipment, and control systems.

AQ PDF-4 The applicant shall provide a comprehensive water conservation strategy in compliance with the City of Lake Forest Water Efficient Landscape Ordinance No. 207. Landscape plans shall include the following:

- Sprinkler controls that are weather- or soil-moisture-based
- Drought tolerant plans
- Reclaimed water for landscape irrigation, where available

AQ PDF-5 Site plans for development projects shall identify the area for collection of recyclable materials. The recycling collection area(s) shall be within, near, or adjacent to each trash disposal area. The recycling collection area shall be a minimum of 50 percent of the area provided for the trash enclosure.

AQ PDF-6 Site plans for development projects, including landscaping and improvement plans, shall identify the location of bicycle access and bicycle rack areas, to the satisfaction of the Director of Development Services. These improvements shall be installed in accordance with those plans.

5.1.3 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, 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.

In addition to the above CEQA Guidelines thresholds, the City of Lake Forest has developed the following threshold:

AQ-6 A project will be considered to result in a cumulatively considerable net increase of any criteria pollutants 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) where the incremental effect of the project emissions, considering together with past, present, and reasonably anticipated further project emissions, increase the level of any criteria pollutant above the existing ambient level.

The Modified Initial Study, included as Appendix A, substantiates that impacts associated with the following thresholds would be less than significant:

- Thresholds AQ-1 and AQ-5

These impacts will not be addressed in the following analysis.

South Coast Air Quality Management District Thresholds

Regional Significance Thresholds

CEQA allows for the significance criteria established by the applicable air quality management or air pollution control district to be used to assess impacts of a project on air quality. The SCAQMD has established thresholds of significance for air quality for construction activities and project operation, as shown in Table 5.1-4:

Table 5.1-4
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

Source: SCAQMD 2007.

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 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 developed localized significance thresholds (LSTs) for emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$ generated at the project site (offsite 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. LSTs are based on the ambient concentrations of that pollutant within the project Source Receptor Area (SRA) and the distance to the nearest sensitive receptor. For this project, the appropriate SRA is the Saddleback Valley area (Area 19). LST analysis for construction is applicable for all projects of five acres and less; however, it can be used as screening criteria for larger projects to determine whether or not dispersion modeling may be required.

The nearest sensitive receptors are residential uses to the north of the project site boundary, approximately 2,000 feet (610 meters) from the property line. Other residences are located approximately 3,000 feet to the south and west. Based on the SCAQMD LST guidelines, receptors beyond 500 meters of the project boundary can be evaluated against the emission thresholds at 500 meters as a worst-case scenario. Using the LST thresholds for receptors at 500 meters from a 5-acre site for this project within SRA 19 would result in a conservative analysis because project operational emissions would be emitted over an area much larger than a 5-acre site.

The construction LSTs are based on guidance provided by SCAQMD for the CalEEmod program, which is based on construction equipment house and maximum daily soil disturbance activity possible for each piece of equipment. Based on the CalEEMod results, the SBRA Project would result in a maximum of 4.0-acres disturbed on any one day and the LSTs for a 4-acre site are applicable. Construction LSTS based on the closest sensitive and non-sensitive land uses for Phase 1 and Phase 2 and 3 are shown in Table 5.1-5. Dispersion modeling using the thresholds in Table 5.1-6 is required for emissions that exceed the screening LSTs shown in Table 5.1-5.

Table 5.1-5
SCAQMD Localized Significance Threshold: Screening Level Analysis

Air Pollutant	Threshold (lbs/day)		
	Construction		
	Phase 1[1]	Phase 2 & 3[2]	Operation[3]
Nitrogen Oxides (NO_2)	263	175	278
Carbon Monoxide (CO)	9,823	1,534	10,507
Coarse Particulates (PM_{10})	142	10	36
Fine Particulates ($PM_{2.5}$)	85	7.0	22

Source: LSA 2011
[1] Based on LSTs for a 4-acre site with Phase 1 receptors at 1,640 feet (500 meters).
[2] Assumes residential uses in Phase 1 are occupied during Phase 2 and 3 construction. LSTs are based on a 4-acre site for Phase 2 and 3 receptors at 82 feet (25 meters) from the source.
[3] Based on LSTs for a 5-acre site with receptors at 1,640 feet (500 meters) from the source.

Table 5.1-6
SCAQMD Localized Significance Thresholds Based on Ambient Air Quality Standards for Projects Larger than 5 Acres

Air Pollutant (Relevant AAQS)	Concentration
1-Hour CO Standard (California AAQS)	20 ppm
8-Hour CO Standard (California AAQS)	9.0 ppm
1-Hour NO_2 Standard (National AAQS)[1]	0.100 ppm
24-Hour PM_{10} Standard (SCAQMD)[2]	10.4 $\mu g/m^3$
24-Hour PM_{10} Standard (SCAQMD)[2]	2.5 $\mu g/m^3$

Notes: ppm: parts per million; $\mu g/m^3$ – micrograms per cubic meter
[1] Updated based on the new national AAQS adopted January 2010.
[2] 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.

5.1.4 Environmental Impacts

The following impact analysis addresses thresholds of significance for which the Modified Initial Study disclosed new potentially significant impacts that could result from the new information associated with the SBRA Project. The applicable thresholds are identified in brackets after the impact statement.

IMPACT 5.1-1: CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE PROPOSED PROJECT WOULD GENERATE SHORT-TERM EMISSIONS IN EXCEEDANCE OF SCAQMD'S THRESHOLD CRITERIA. [THRESHOLDS AQ-2, AQ-3, AND AQ-6]

Impact Analysis: Construction activities produce combustion emissions from various sources such as site grading, utility engines, on-site heavy-duty construction vehicles, asphalt paving, and motor vehicles transporting the construction crew. Table 5.1-7 shows the planned construction schedule:

Table 5.1-7
Construction Schedule

Phase Name	Start Date	End Date	Number of Days
Phase 1 Grading – 3.57M CY	9/17/2012	1/16/2013	88
Phase 2 Grading – 9.26M CY	1/5/2015	11/23/2015	231
Phase 1A			
Infrastructure - includes Alton Phase 1	1/21/2013	3/26/2014	308
Homebuilding – 603 DU	9/16/2013	3/25/2016	660
Phase 1B			
Infrastructure	5/6/2013	3/7/2014	220
Apartment Construction – 594 DU	9/16/2013	3/25/2016	660
Alton Phase 2			
Alton Phase 2	11/3/2014	3/4/2015	88
Phase 2			
Infrastructure	5/18/2015	3/18/2016	220
Homebuilding – 147 DU	9/7/2015	3/16/2018	660
Phase 3A			
Infrastructure	7/13/2015	4/13/2016	198
Homebuilding – 385 DU	10/5/2015	4/13/2018	660
Phase 3B			
Infrastructure	4/11/2016	3/14/2017	242
Homebuilding – 650 DU	9/12/2016	3/26/2020	924
Borrego – included in Phase 2 Grading			
SD & Access Road	5/25/2015	10/23/2015	110

Source: LSA 2011
cy –– cubic yards
DU – dwelling units
M – million

Exhaust emissions from construction activities envisioned on site would vary daily as construction activity levels change. The use of construction equipment on site would result in localized exhaust emissions. Table 5.1-8 lists the anticipated equipment to be used on any one day for each phase.

Table 5.1-8
Construction Equipment Utilized by Construction Phase

Construction Phase	Off-Road Equipment Type	Off-Road Equipment Unit Amount	Hours Used per Day	Horsepower	Load Factor
Infrastructure	Generator Sets	2	8	84	0.5
	Other Construction Equipment	4	7	327	0.42
	Rough Terrain Forklifts	2	6	83	0.4
	Trenchers	2	4	69	0.5
Grading	Excavators	2	8	157	0.38
	Graders	1	8	162	0.41
	Rubber-Tired Dozers	1	8	358	0.40
	Scrapers	2	8	356	0.48
	Tractors/Loaders/Backhoes	2	8	75	0.37
Building Construction	Cranes	1	7	208	0.29
	Forklifts	3	8	149	0.20
	Generator Sets	1	8	84	0.50
	Tractors/Loaders/Backhoes	3	7	75	0.37
	Welders	1	8	46	0.30
Architectural Coating	Air Compressors	1	6	78	0.33
Paving	Pavers	2	8	89	0.42
	Paving Equipment	2	8	82	0.36
	Rollers	2	8	84	0.38

Source: LSA 2011. Project Plans and CalEEMod Defaults.
Note: The load factors have been reduced by 33 percent as directed by CARB to correct for an error in the OFFROAD model.

The most recent version of the CalEEMod model (Version 2011.1.1) was used to calculate the construction emissions, as shown in Table 5.1-9. The emissions rates shown in Table 5.1-9 are from the CalEEMod output tables listed as "Mitigated Construction," even though the only mitigation measures that have been applied to the analysis are the required construction emissions control measures as specified in SCAQMD Rules 402 and 403 and described in Section 5.5 of the *Shea Baker Ranch Air Quality Analysis* (LSA 2011). They are also the combination of the onsite and offsite emissions. The construction plans include the onsite transport of approximately 2,000,000 cubic yards (cy) of soil over a 3-month period; the haul truck emissions related to this operation are shown in Table 5.1-9 as "Onsite Soil Hauling."

It is expected that some of the construction phases will overlap; for example, the Building Construction and Architectural coating phases will overlap within each phase, and Phases 2 and 3 will overlap. Thus, exceedances of VOC and NO_X are expected.

Table 5.1-9
Short-Term Regional Construction Emissions

Construction Phase	Total Regional Pollutant Emissions, lbs/day								
	VOC	NOX	CO	SO2	Fugitive PM10	Exhaust PM10	Fugitive PM2.5	Exhaust PM2.5	CO2e
Grading – Phase 1	13	104	57	0.1	3.7	5.0	1.3	5.0	11,000
Grading – Phase 2	11	83	50	0.1	3.7	3.8	1.3	3.8	11,000
Onsite Soil Hauling	1.5	21	11	0.04	0	0.79	0	0.34	3,700
Phase 1A									
Infrastructure	12	112	58	0.16	2.8	5.0	0.07	4.9	17,000
Building Construction	17	87	150	0.28	23	4.5	0.33	4.3	28,000
Architectural Coating	48	4.3	20	0.03	4.1	0.38	0.05	0.37	3,600
Paving	5.1	30	21	0.03	0.23	2.6	0	2.6	3,100
Phase 1B									
Infrastructure	12	112	58	0.16	2.8	5.0	0.07	4.9	17,000
Building Construction	17	87	150	0.28	23	4.5	0.33	4.3	28,000
Architectural Coating	48	4.3	20	0.03	4.1	0.38	0.05	0.37	3,600
Paving	5.1	30	21	0.03	0.23	2.6	0	2.6	3,100
Phase 2									
Infrastructure	10	92	53	0.16	2.8	4.0	0.07	3.9	17,000
Building Construction	15	72	130	0.28	23	3.7	0.33	3.5	27,000
Architectural Coating	49	3.7	17	0.03	4.1	0.34	0.05	0.33	3,400
Paving	4.5	26	21	0.03	0.23	2.2	0	2.2	3,100
Phase 3A									
Infrastructure	7.1	56	32	0.09	0.38	2.8	0.01	2.8	9,900
Building Construction	15	72	130	0.28	23	3.7	0.33	3.5	27,000
Architectural Coating	48	3.7	17	0.03	4.1	0.34	0.05	0.33	3,400
Paving	4.5	26	21	0.03	0.23	2.2	0	2.2	3,100
Phase 3B									
Infrastructure	9.5	83	51	0.16	2.8	3.6	0.07	3.5	17,000
Building Construction	14	66	120	0.28	23	3.4	0.33	3.2	27,000
Architectural Coating	33	3.4	16	0.03	4.1	0.31	0.05	0.3	3,400
Paving	3.9	23	21	0.03	0.23	1.8	0	1.8	3,100
Peak Daily Emissions[1]	**83**	**233**	**250**	**0.5**	**42**		**13**		**No Threshold**
SCAQMD Thresholds	**75**	**100**	**550**	**150**	**150**		**55**		
Significant Emissions?	**Yes**	**Yes**	**No**	**No**	**No**		**No**		

Source: LSA Associates, Inc., December 2011.
Notes:
CO_2e = carbon dioxide equivalent
lbs/day = pounds per day
[1] The peak daily emissions are the sum of the components of each phase with on-site soil hauling added.

Table 5.1-9 shows that daily regional construction emissions could exceed the daily thresholds of VOCs and NO_x established by the SCAQMD.

Fugitive dust emissions are generally associated with land clearing and exposure of soils to the air and wind, as well as cut-and-fill grading operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations, and weather conditions at the time of construction. Construction emissions can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other

factors. The SBRA Project will be required to comply with SCAQMD Rules 402 and 403 to control fugitive dust.

Table 5.1-9 lists total construction emissions (i.e., fugitive-dust emissions and construction-equipment exhausts) that have incorporated a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction.

Architectural coatings contain VOCs, which are O_3 precursors. The SCAQMD VOC threshold is 75 lbs/day. A combination of VOC emissions from architectural coatings and other construction activities would result in a in a peak of 83 lbs/day. Emissions exceed the SCAQMD thresholds and are considered significant and unavoidable.

IMPACT 5.1-2: THE PROPOSED PROJECT WOULD CONTINUE TO EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTANT CONCENTRATIONS DURING CONSTRUCTION OF PHASES 2 AND 3. [THRESHOLD AQ-4]

Impact Analysis: The SBRA Project could expose sensitive receptors to elevated pollutant concentrations during construction activities if it would cause or contribute significantly to elevated pollutant concentration levels. Sensitive receptors include residences, schools, hospitals, and similar uses. Unlike the mass (pounds per day) of construction emissions shown in Table 5.1-9, described as pounds per day, localized concentrations refer to an amount of pollutant in a volume of air (ppm or μg/m3) and can be correlated to potential health effects.

Localized Significance Thresholds

Construction LST

The SCAQMD has issued guidance on applying CalEEMod modeling results to LST analyses. Since CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily soil disturbance activity possible for each piece of equipment, Table 5.13-10 has been provided by the SCAQMD to determine the maximum daily disturbed acreage for comparison to LSTs.

Table 5.1-10
Equipment Specific Grading Rates

Equipment Type	*Acres/8-Hour Day*
Crawler Tractor	0.5
Graders	0.5
Rubber-Tired Dozers	0.5
Scrapers	1

Source: CalEEMod User Guide Appendix A.

As shown in Table 5.1-10, during grading two excavators (crawler tractor), one grader, one rubber-tired dozer, and two scrapers could be used simultaneously on one peak day. Based on Table 5.1-10, the SBRA Project will result in a maximum of 4.0 acres disturbed on any one day during the grading phase. Thus, LSTs for a 4-acre site are applicable for the project.

There are no existing residential uses immediately adjacent to the project site. There are existing commercial and light industrial uses to the north, east, and south of the project site. A recreational vehicle storage site is

located to the southwest of the project site. There are plant nurseries to the east and west of the project site. However, it is expected that during the construction of Phases 2 and 3, some of the residences in Phase 1 could be occupied. The distance from Phases 2 and 3 construction operations to Phase 1 residences could be as close as 25 meters.

Table 5.1-11 shows that the emissions of these pollutants on the peak day of Phase 1 construction (Development Phases 1A, 1B and Phase 2) will not result in concentrations of pollutants at nearby residences or other sensitive receptors that are at or above the SCAQMD thresholds of significance. However, during Phases 2 and 3, the concentrations of PM_{10} and $PM_{2.5.}$ could exceed the SCAQMD thresholds of significance. Construction operations conducted during Phases 2 and 3 near to occupied residences in Phase 1 would need additional dust control measures to be implemented.

Table 5.1-11
Construction LST Impacts

Emissions Sources	*NO_X*	*CO*	*PM_{10}*	*$PM_{2.5}$*
Phase 1 Construction				
On-site Emissions	74	39	11	7.5
LST Thresholds[1]	**263**	**9,823**	**142**	**85**
Significant Emissions?	**No**	**No**	**No**	**No**
Phases 2 and 3 Construction				
On-Site Emissions	74	39	11	7.5
LST Thresholds[2]	**175**	**1,534**	**10**	**7.0**
Significant Emissions?	**No**	**No**	**Yes**	**Yes**

Source: LSA December 2011.
ac = acres
lbs/day = pounds per day
m = meters
[1] Source Receptor Area: Saddleback Valley, 4 ac, 500 meter distance,
[2] Source Receptor Area: Saddleback Valley, 4 ac, 25 meter distance,

Table 5.1-11 shows that during Phase 1 there will be no LST impacts; however, during Phases 2 and 3 when some of the residences of Phase 1 could be occupied, there is a potential for significant PM_{10} and $PM_{2.5}$ LST impacts.

Fugitive dust control measures are incorporated as a part of the OSA PEIR mitigation measure MM 3.3-7 (listed as AQ MM-7 below). Incorporation of AQ MM-7 would reduce peak daily construction-related emissions of PM_{10} and $PM_{2.5,}$ but not below their respective SCAQMD regional thresholds. Consequently, construction air quality impacts would be similar to those of the OSA PEIR, remaining significant and unavoidable. The project's contribution to short-term construction emissions is consistent with the analysis of the impact in the OSA PEIR. No additional feasible mitigation measures are available.

Operational LST

Table 5.1-12 shows the calculated emissions for the proposed operational activities compared with the appropriate LSTs. The LST analysis only includes onsite sources; however, the CalEEMod model outputs do not separate onsite and offsite emissions for mobile sources. For a worst-case scenario assessment, the emissions shown in Table 5.1-12 include all onsite project-related stationary sources and 5 percent of the project-related new mobile sources, which is an estimate of the amount of project-related new vehicle traffic that will occur on site. Considering the total trip length included in the CalEEMod model, the 5 percent assumption is conservative.

Table 5.1-12
Long-Term Operational LST Numbers

Emissions Sources	NO_X	CO	PM_{10}	$PM_{2.5}$
On-Site Emissions	17	260	18	4.9
LST Thresholds	**278**	**10,507**	**36**	**22**
Significant Emissions?	**No**	**No**	**No**	**No**

Source: LSA December 2011.
Source Receptor Area: Saddleback Valley, 5 ac, 500 m distance, on-site traffic 5 percent of total
ac = acres
lbs/day = pounds per day
m = meters

Table 5.1-12 shows that the operational emission rates would not exceed the LST thresholds for receptors at 500 meters. Therefore, the proposed operational activity would not result in a localized significant air quality impact from existing conditions.

Naturally Occurring Asbestos

The SBRA project site is located in Orange County, which is not among the counties that are found to have serpentine and ultramafic rock in their soils. Therefore, the potential risk for naturally occurring asbestos during project construction is small and less than significant.

CO Hotspot Analysis

The project would expose sensitive receptors to elevated pollutant concentrations if it would cause or contribute significantly to elevated pollutant concentration levels. Localized concentrations refer to the amount of pollutant in a volume of air (ppm or $\mu g/m^3$) and can be correlated to potential health effects. The OSA PEIR evaluated impacts of the project related to CO hotspots and air quality compatibility with regard to air toxics. The OSA PEIR evaluated but did not find localized impacts (microscale) associated with CO hotspots generated by project-related vehicles at congested intersections.

Vehicular trips associated with the SBRA Project would contribute to congestion at intersections and along roadway segments in the project vicinity. Localized air quality impacts would occur when emissions from vehicular traffic increase in local areas as a result of the SBRA Project. The primary mobile source pollutant of local concern is CO, which is a direct function of vehicle idling time and, thus, traffic flow conditions. CO transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations proximate to a congested roadway or intersection may reach unhealthful levels affecting local sensitive receptors (residents, school children, the elderly, hospital patients, etc). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentrations, modeling is recommended to determine a project's effect on local CO levels.

An assessment of project-related impacts on localized ambient air quality requires that future ambient air quality levels be projected. Existing CO concentrations in the immediate project vicinity are not available. Ambient CO levels monitored at the Mission Viejo Station, the closest station with complete monitored CO data, showed a highest recorded 1-hour concentration of 2.9 ppm (State standard is 20 ppm) and a highest 8-hour concentration of 2.2 ppm (State standard is 9 ppm) during the past 3 years (see Table 5.1-3).

The highest CO concentrations would normally occur during peak traffic hours; hence, CO impacts calculated under peak traffic conditions represent a worst-case analysis. Because the ambient CO

concentrations are much lower than the corresponding federal and State CO standards, the amount of project-related new vehicular traffic is not expected to result in CO levels, when added to the low ambient CO levels, that exceed the federal or State CO standards. The CALINE4 model was used to calculate the CO concentrations, in combination with the peak turn volumes at the intersections most affected by project-related traffic in the project vicinity. CALINE4 model printouts are included in Air Quality Study, included as DSEIR Appendix C.

Consistent with the project traffic impact analysis report, the analysis considered the project scenarios for the existing conditions with the Alton Parkway extension and with- and without-project future (2015 and 2030) conditions. Project-related changes in CO concentrations would be 0.4 ppm or less under all with-project scenarios, and all CO concentrations would remain well below their respective State and federal standards. Because CO hot spots would not occur, the SBRA Project would not have a significant impact on local air quality for CO, and no mitigation measures would be required.

IMPACT 5.1-3: ***LONG-TERM OPERATION OF THE PROJECT WOULD GENERATE AIR POLLUTANT EMISSIONS THAT WOULD CONTINUE TO EXCEED THE SCAQMD'S REGIONAL SIGNIFICANCE THRESHOLDS FOR VOC, NO_x, PM_{10}, AND CO AND CUMULATIVELY CONTRIBUTE TO THE SOUTH COAST AIR BASIN'S NONATTAINMENT DESIGNATIONS. [THRESHOLDS AQ-2, AQ-3 AND AQ-6]***

Impact Analysis: Long-term air pollutant emission impacts are those associated with stationary sources and mobile sources involving any project-related changes. From existing conditions, the SBRA Project would result in a net increase in the number of residents in the project area; therefore, the SBRA Project would result in net increases in both stationary and mobile source emissions. The stationary source emissions would come from many sources, including the use of consumer products, landscape equipment, general energy consumption and distribution, and solid waste. Based on trip generation factors, included in the traffic study, that are obtained from the ITE *Trip Generation Manual* (8th ed.), which are also the default trip generation factors included in the CalEEMod model, long-term operational emissions associated with the SBRA Project, calculated with the CalEEMod model, are shown in Table 5.1-13. Area sources include architectural coatings, consumer products, fireplace, and landscaping. Energy sources include natural gas consumption for heating and cooking.

Although implementation of PDFs (AQ PDF-1 through AQ PDF-5) would reduce these emissions, Table 5.1-13 shows that the increase of all criteria pollutants as a result of the SBRA Project would still be higher than the corresponding SCAQMD daily emission thresholds, except for SOX and $PM_{2.5.}$ There are no other feasible mitigation measures that would reduce this impact to a less than significant level. As a result, long-term pollutant emission impacts are significant and unavoidable.

Table 5.1-13
Shea/Baker Ranch Long-Term Regional Operational Emissions

Source	Pollutant Emissions, lbs/day					
	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	85	2.4	200	0.01	4.0	4.0
Energy Sources	2.0	17	7.3	0.11	1.4	1.4
Mobile Sources	120	290	1,100	2.4	270	17
Total Project Emissions	**207**	**310**	**1,300**	**2.5**	**280**	**22**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**No**

Source: LSA December 2011.
CO_2 = carbon dioxide
lbs/day = pounds per day

5.1.5 Cumulative Impacts

The project would contribute criteria pollutants to the area during temporary project construction. A number of individual projects in the area may be under construction simultaneously with the SBRA Project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction could result in substantial short-term increases in air pollutants. However, each project would be required to comply with the SCAQMD's standard construction measures. The SBRA Project's short-term construction emissions would exceed the significance thresholds. The increase of all criteria pollutants as a result of the SBRA Project from existing conditions would be higher than the corresponding SCAQMD daily emission thresholds, except for SO_x and $PM_{2.5.}$ No significant cumulative impacts were identified with regard to CO hot spots. As compared to existing conditions, since the SBRA Project alone would have a significant short-term impact, it would also have a significant short-term cumulative impact.

5.1.6 Existing Regulations

Construction Operations

The project is required to comply with regional rules that assist in reducing short-term air pollutant emissions. SCAQMD Rule 403 requires that fugitive dust be controlled with best-available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors. See http://www.aqmd.gov/rules/reg/reg04/r403.pdf for rule details. Implementation of Rule 403 measures results in dust emissions below SCAQMD thresholds.

The applicable Rule 403 measures are as follows:

- Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
- Water active sites at least twice daily. (Locations where grading is to occur will be thoroughly watered prior to earthmoving.)

- Cover all trucks hauling dirt, sand, soil, or other loose materials, or maintain at least 0.6 m (2 ft) of freeboard (vertical space between the top of the load and top of the trailer) in accordance with the requirements of California Vehicle Code (CVC) Section 23114.

- Pave construction access roads at least 30 m (100 ft) onto the site from the main road.

- Reduce traffic speeds on all unpaved roads to 15 mph or less.

Operations

The SBRA Project is required to comply with Title 24 of the CCR established by the CEC regarding energy conservation and green buildings standards. Provisions of Title 24 include:

- Low-emission water heaters shall be used. Solar water heaters are encouraged.

- Exterior windows shall utilize window treatments for efficient energy conservation.

- Per Cal Green Code requirements, water-efficient fixtures and appliances, including but not limited to low-flow faucets and dual-flush toilets reducing water consumption by 20 percent from Building Standards Code baseline water consumption, shall be used.

- Per Cal Green Code requirements, a Commissioning Plan shall be prepared and all building systems (e.g., heating, ventilation, and air-conditioning [HVAC], irrigation systems, lighting, water heating) shall be commissioned by the Commissioning Authority.

- Per Cal Green Code requirements, sprinkler controls shall be weather- or soil-moisture-based.

- Per Cal Green Code requirements, a home user's manual shall be provided for each residence that describes operations and maintenance of all equipment, appliances, drainage, space conditioning, irrigation, and water reuse systems installed in the residence.

5.1.7 Level of Significance Before Mitigation

Upon implementation of regulatory requirements and PDFs, the following impacts would be **potentially significant** without mitigation:

- Impact 5.1-1 Construction activities would generate short-term emissions in exceedance of SCAQMD's regional threshold criteria for VOC and NOX and cumulatively contribute to the SoCAB's nonattainment designations.

- Impact 5.1-2 During construction of Phases 2 and 3, when some of the residences of Phase 1 could be occupied, there is a potential for significant PM_{10} and $PM_{2.5}$ LST impacts.

- Impact 5.1-3 Long-term operation of the project would generate air pollutant emissions that would continue to exceed the SCAQMD's regional significance thresholds for VOC, NO_x, PM_{10}, and CO and cumulatively contribute to the SoCAB's nonattainment designations.

5.1.8 Applicable OSA Program EIR Mitigation Measures

The following mitigation measures are taken directly from the OSA PEIR. Modifications to the original mitigation measures are identified in ~~strikeout text~~ to indicate deletions and **bold underlined** to signify additions. They have been renumbered in this document for ease of reference. All of the mitigation measures listed apply to and will be implemented for the proposed SBRA Project.

Impact 5.1-1 and Impact 5.1-2

AQ MM-1 (OSA PEIR Mitigation Measure MM 3.3-1) The developer shall require by contract specifications that all diesel-powered equipment used would be retrofitted with after-treatment products (e.g., engine catalysts) to the extent that it is readily available in the South Coast Air Basin. Contract specifications language shall be reviewed by the City prior to issuance of a grading permit.

AQ MM-2 ~~(OSA PEIR Mitigation Measure MM 3.3-2) The developer shall require by contract specifications that all heavy-duty diesel-powered equipment operating and refueling at a project site within the Project Area would use low NO_x diesel fuel to the extent that it is readily available and cost effective (up to 125 percent of the cost of California ARB diesel) in the South Coast Air Basin (this does not apply to diesel-powered trucks traveling to and from the project sites within the Project Area). Contract specification language shall be reviewed by the City prior to issuance of a grading permit.~~ (*Mitigation Measure MM 3.3-2 is deleted because low-NOx diesel fuel is no longer manufactured and is not available for purchase.*)

AQ MM-3 (OSA PEIR Mitigation Measure MM 3.3-3) The developer shall require by contract specifications that alternative fuel construction equipment (i.e., compressed natural gas, liquid petroleum gas, and unleaded gasoline) and low-emission diesel construction equipment would be utilized to the extent that the equipment is readily available and cost effective in the South Coast Air Basin. Contract specification language shall be reviewed by the City prior to issuance of a grading permit.

AQ MM-4 (OSA PEIR Mitigation Measure MM 3.3-4) The developer shall require by contract specifications that construction equipment engines will be maintained in good condition and in proper tune per manufacturer's specification for the duration of construction. Contract specification language shall be reviewed by the City prior to issuance of a grading permit.

AQ MM-5 (OSA PEIR Mitigation Measure MM 3.3-5) The developer shall require by contract specifications that construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than five minutes. Contract specification language shall be reviewed by the City prior to issuance of a grading permit.

AQ MM-6 (OSA PEIR Mitigation Measure MM 3.3-6) The developer shall require by contract specifications that construction operations rely on the electricity infrastructure surrounding the construction site rather than electrical generators powered by internal combustion engines to the extent feasible. Contract specification language shall be reviewed by the City prior to issuance of a grading permit.

AQ MM-7 (OSA PEIR Mitigation Measure MM 3.3-7)The developer shall implement dust control measures consistent with SCAQMD Rule 403— Fugitive Dust during the construction phases of new project development. Contract specification language shall be reviewed for inclusion of this language by the City prior to issuance of a grading permit. The following actions are currently

recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation:

- Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days)
- Replace ground cover in disturbed areas as quickly as possible
- Enclose, cover, water ~~twice~~ **three times** daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content
- Water trucks will be utilized on the site and shall be available to be used throughout the day during site grading to keep the soil damp enough to prevent dust being raised by the operations. Water active grading sites at least twice daily
- Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period
- All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code
- Sweep streets at the end of the day
- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip on a gravel surface to prevent dirt and dust from impacting the surrounding areas.
- Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces
- Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads

Impact 5.1-3

There are no feasible mitigation measures (beyond the Project Design Features listed above) that would reduce operational air quality impacts.

5.1.9 Additional Mitigation Measures

No additional mitigation measure are available. All feasible mitigation measures have been incorporated into the proposed SBRA Project as discussed in Section 5.1.2 above.

5.1.10 Level of Significance After Mitigation

While mitigation measures would result in reduced emissions during construction, these reductions would not be sufficient to reduce all emissions to a less than significant level. Moreover, there are no feasible

mitigation measures (beyond the Project Design Features listed above) that would reduce operational air quality impacts. Thus, the regional and local construction emissions (Impact 5.1-1 and Impact 5.1-2, respectively) and operational emissions (Impact 5.1-3) would remain significant and unavoidable.

Impact 5.1-1: Short-Term Air Quality Impacts due to Emissions of VOC and NO_X

Construction activities would generate short-term emissions in exceedance of SCAQMD's regional threshold criteria for VOC and NO_X and cumulatively contribute to the SoCAB's nonattainment designations. While mitigation measures would result in reduced emissions during construction these reductions would not be sufficient to reduce all emissions to a less than significant level. Impact 5.1-1 would remain significant and unavoidable. Though it was not quantified, air quality impacts related to short-term construction impacts were also identified as significant in the OSA PEIR.

Impact 5.1-2: Short-Term Air Quality Impacts due to Grading Activities

During construction of Phases 2 and 3, when some of the residences of Phase 1 could be occupied, there is a potential for significant PM_{10} and $PM_{2.5}$ LST impacts. While mitigation measures would result in reduced emissions during construction, these reductions would not be sufficient to reduce all emissions to a less than significant level. Impact 5.1-2 would remain significant and unavoidable. Though it was not quantified, air quality impacts related to short-term construction impacts were also identified as significant in the OSA PEIR.

Impact 5.1-3: Project Operation Exceeds Thresholds for VOC, NO_x, PM_{10}, and CO

Long-term operation of the project would generate air pollutant emissions that would continue to exceed the SCAQMD's regional significance thresholds for VOC, NO_x, PM_{10}, and CO and cumulatively contribute to the SoCAB's nonattainment designations. While mitigation measures would result in reduced emissions during construction and operation, these reductions would not be sufficient to reduce all emissions to a less than significant level. Impact 5.1-3 would remain significant and unavoidable. Air quality impacts related to long-term operational impacts were also identified as significant in the OSA PEIR.