5.2 Air Quality

This section analyzes the potential air quality impacts associated with the Proposed Project in terms of short-term (construction) impacts and long-term (operational) impacts. Information in this section is based on the "Air Quality and Greenhouse Gas Emissions Impact Analysis" (Air Quality Analysis) prepared by Giroux & Associates (Giroux) dated July 2013. The complete Air Quality Analysis, including appendices, is included herein as Appendix C.

5.2.1 Existing Conditions

1. Climate

The Project Site is located in the South Coast Air Basin (SCAB). The Basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean and high mountains. The climate in the SCAB is determined by its terrain and geographical location and is dominated by the strength and position of the semi-permanent high pressure center over the Pacific Ocean near Hawaii. The climate, including the Project Area, is described as a Mediterranean-type climate characterized by long, warm summers and moderate winters with moderate precipitation and a maritime influence resulting in a marine layer and a temperature inversion layer.

a. Temperature

The average temperature varies little throughout the SCAB, averaging 62°F. High temperatures in the Project Area average 75°F during the summer and 65.5°F during the winter. Low temperatures average 62.2°F during summer nights and 48.6°F during winter nights.

b. Winds

Winds in the vicinity display several characteristics. Summer daytime winds are generally from the south in the morning and the west in the afternoon. The warm air during spring and early summer lifts most of the pollution produced on an average day and moves it through the mountain passes.

Acronyms used in this section:

AAQS	Ambient Air Quality Standards
AQMD	Air Quality management District
AQMP	Air Quality Management Plan
ASF	age sensitivity factor
BACM	best available control measure
CAAA	Clean Air Act Amendments
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO	carbon monoxide
DPM	diesel particulate matter
EPA	Environmental Protection Agency
LST	localized significance thresholds
RACM	reasonably available control measure
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
TAC	toxic air contaminants

Late summer and winter months see a less pronounced flushing effect due to the lower wind speeds and early off-shore winds. Pollutants are trapped in the valleys of the region due to this stagnation.

When high pressure occurs over the region, a hot, dry, and gusty “Santa Ana Winds” condition occurs from the north and northeast across the basin. The average summer daytime wind speed in the Project Area is between seven and nine miles per hour. During winter nights, when the ocean temperatures are warmer than the land temperature, an offshore wind of three to five miles per hour is created. Under normal conditions, the light, average wind speeds limit the capability to disperse air contaminants horizontally. The net effect is that any locally generated air pollutants will be carried offshore at night and inland by day.

Adequate daytime ventilation speed typically does not allow for stagnation of air pollutants in the Project Area. Moderate onshore breezes carry locally generated emissions eastward toward Chino Hills or across northern Orange County and up Santa Ana or Carbon Canyons towards western San Bernardino and Riverside counties. Daytime air quality problems occur when winds shift into the northwest and the sea breeze is replaced by airflow across substantial pollution generation areas of southwestern Los Angeles County. Occasional unhealthful smog levels near the Project Site during the summer and early fall are the result of slower nighttime winds drifting seaward across the air basin, allowing for stagnation of pollution. However, during the night the density of vehicular sources in the upwind area is generally low enough to minimize any major air pollution problems. The Air Quality Analysis determined that air pollution episodes, if any, are due mainly to pollutants transported into the area rather than any locally generated emissions.

c. Temperature Inversions

Temperature inversions result when the daytime onshore flow of marine air is capped by a dome of warm air that acts like a lid over the basin. Temperature inversions may be ground-based or elevated. Ground-based inversions are most severe during clear, cold early winter mornings when very little air mixing or turbulence occurs, generally breaking down by mid-morning. The height of the base of the inversion is known as the “mixing height.” This height changes depending on atmospheric conditions; however, the top of the inversion remains constant. This lack of mixing results in high concentrations of primary pollutants accumulating near major roadways where relatively higher emissions occur. Elevated inversion layers, conversely, result from a variety of meteorological phenomena. Elevated inversion layers restrict vertical mixing of air, forming a restrictive upper boundary. Dispersion of air pollutants is unrestricted below an elevated inversion layer.

As the ocean air moves inland, pollutants are continually added from below without any dilution from above. This layer slows down in inland valleys and undergoes photochemical transformations due to sunlight, creating unhealthful levels of smog (ozone). Ozone typically occurs in high concentrations in late spring, summer, and early fall when light winds, low mixing height, and increased sunlight combine, resulting in ozone production. Smog effects are less significant when there is no inversion layer or when winds average 15 miles per hour or greater.

Nighttime inversions, especially during the winter, form as cool air pools in low elevations while the upper air remains warm. Shallow radiation inversions are formed that trap pollutants near intensive traffic sources such as freeways, forming localized effects called "hot spots."

Pollutants generated by stationary and mobile sources mix with less contaminated air beneath the inversion layer and will become more concentrated unless the inversion breaks down. When strong inversions are formed on cool winter nights, carbon monoxide (CO) generated by automobile exhaust becomes concentrated. Generally, the highest levels of CO are produced during the months of November through February.

2. Baseline Air Quality

The South Coast Air Quality Management District (SCAQMD) Anaheim monitoring station, which is the nearest station to the Proposed Project, was used to determine existing and probable future levels of air quality in the Project Area. The station measures regional pollution levels (smog) and primary vehicular pollution levels near busy roadways (carbon monoxide, nitrogen oxides). Pollutants such as PM_{10} and $PM_{2.5}$ are also monitored. A six-year air quality monitoring summary (2006-2011) is found in Table 5-2-1 below. The Project Site is vacant land that currently contributes minimally to air quality impacts. The Air Quality Analysis provides the following conclusions regarding air quality trends based on the table.

- Photochemical smog (ozone) levels occasionally exceed standards. The 1-hour state standard and the 8-hour state and federal ozone standard have been exceeded an average of 1% of all days in the past six years. Years 2009, 2010 and 2011 demonstrate progressively improved ozone levels in the area. While ozone levels are still high, they are much lower than 10 to 20 years ago.
- Respirable dust (PM_{10}) levels occasionally exceed the state standard on approximately 6% of measured days. As with ozone, the frequency of violations has noticeably decreased in 2009-2011. The less stringent federal PM_{10} standard was violated once in 2007 during a wildfire event.
- The federal ultra-fine particulate ($PM_{2.5}$) standard of 35 $\mu g/m^3$ has been exceeded about 2% of measurement days in the last six years. Similarly, 2009-2011 have been the "cleanest" years on record.

- More localized pollutants such as carbon monoxide, nitrogen oxides, etc. are very low near the Project Site. These pollutants can be naturally dispersed to reduce localized vehicular air pollutants such as NO_X or CO without any threat of violating applicable ambient air quality standards (AAQS).

While complete attainment of every standard is not imminent, the steady improvement trend suggests that such attainment could occur within the reasonably near future.

Table 5-2-1 Air Quality Monitoring Summary (2006-2011)

Pollutant/Standard	Number of Days Standards Were Exceeded and Maximum Levels During Such Violations (entries shown as ratios = samples exceeding standard/samples taken)					
	2006	2007	2008	2009	2010	2011
Ozone						
1-hour > 0.09 ppm (state standard)	6	2	2	0	1	0
8-hour > 0.07 ppm (state standard)	5	7	10	2	1	1
8--hour > 0.075 ppm (federal standard)	3	1	5	1	1	0
Maximum 1-hour concentration (ppm)	0.113	0.127	0.105	0.093	0.104	0.088
Maximum 8-hour concentration (ppm)	0.089	0.100	0.086	0.077	0.088	0.072
Carbon Monoxide						
1-hour > 20. ppm (state standard)	0	0	0	0	0	0
8-hour > 9. ppm (state and federal standard)	0	0	0	0	0	0
Maximum 1-hour concentration (ppm)	4.5	3.6	4.1	3.2	3.0	2.7
Maximum 8-hour concentration (ppm)	2.9	2.9	3.4	2.7	2.0	2.1
Nitrogen Dioxide						
1-hour > 0.18 ppm (state standard)	0	0	0	0	0	0
Maximum 1-hour concentration (ppm)	0.114	0.086	0.093	0.068	0.073	0.074
Inhalable Particulates (PM_{10})						
24-hour > 50 $\mu g/m^3$ (state standard)	7/55	6/59	3/58	1/56	0/57	2/57
24-hour > 150 $\mu g/m^3$ (federal standard)	0/55	1/59	0/58	0/56	0/57	0/57
Maximum 24-hour concentration ($\mu g/m^3$)	103.	488.*	61.	62.	43.	53.
Ultra-Fine Particulates ($PM_{2.5}$)						
24-hour > 35 $\mu g/m^3$ (federal standard)	7/314	14/336	5/304	4/334	0/331	2/365
Maximum 24-hour concentration ($\mu g/m^3$)	56.2	79.4	67.8	64.5	31.7	39.2

*wildfire event
Source: South Coast Air Quality Management District, Anaheim Station (3176)

5.2.2 Regulatory Setting

The SCAQMD and the California Air Resources Board (CARB) are the principal agencies charged with managing air quality within the SCAB. The SCAQMD establishes and enforces regulations for stationary (non-mobile) sources of air pollution within the SCAB. The CARB is responsible for controlling motor vehicle emissions, establishing legal emissions rates for new vehicles, and the vehicle inspection program.

1. Ambient Air Quality Standards (AAQS)

To gauge the significance of the air quality impacts of the Proposed Project, those impacts, together with existing background air quality levels, must be compared to the applicable ambient air quality standards. These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare of those people most susceptible to further respiratory distress. This group, called “sensitive receptors,” includes asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. National AAQS were established in 1971 for six pollution species with states retaining the option to add other pollutants, require more stringent compliance, or include different exposure periods. The federal Clean Air Act Amendments (CAAA) of 1990 required that the Environmental Protection Agency (EPA) review all national AAQS in light of known health effects. The EPA was charged with modifying existing standards or initiating new standards where appropriate. EPA subsequently developed standards for chronic ozone exposure (8+ hours per day) and for very-small-diameter particulate matter ($PM_{2.5}$). New national AAQS were adopted on July 17, 1997.

Because the State of California had established AAQS several years before the federal action, and because of unique air quality problems introduced by the restrictive dispersion meteorology, there is a considerable difference between state and national clean air standards. Table 5-2-2 below describes the health effects of the major criteria pollutants and lists sources and primary effects for each. The standards currently in effect in California and the national standards are shown in Table 5-2-3, respectively.

Table 5-2-2 Health Effects of Major Criteria Pollutants

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust • Natural events, such as decomposition of organic matter	• Reduced tolerance for exercise • Impairment of mental function • Impairment of fetal development • Death at high levels of exposure • Aggravation of some heart diseases (angina)
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust • High temperature stationary combustion • Atmospheric reactions	• Aggravation of respiratory illness • Reduced visibility • Reduced plant growth • Formation of acid rain
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight	• Aggravation of respiratory and cardiovascular diseases • Irritation of eyes • Impairment of cardiopulmonary function • Plant leaf injury
Lead (Pb)	• Contaminated soil	• Impairment of blood function and nerve construction • Behavioral and hearing problems in children
Fine Particulate Matter (PM_{10})	• Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions.	• Reduced lung function • Aggravation of the effects of gaseous pollutants • Aggravation of respiratory and cardio respiratory diseases • Increased cough and chest discomfort • Soiling • Reduced visibility
Fine Particulate Matter ($PM_{2.5}$)	• Fuel combustion in motor vehicles, equipment, and industrial sources • Residential and agricultural burning • Industrial processes • Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics	• Increases respiratory disease • Lung damage • Cancer and premature death • Reduces visibility and results in surface soiling
Sulfur Dioxide (SO_2)	• Combustion of sulfur-containing fossil fuels • Smelting of sulfur-bearing metal ores • Industrial processes	• Aggravation of respiratory diseases (asthma, emphysema) • Reduced lung function • Irritation of eyes • Reduced visibility • Plant injury • Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board, 2002

Table 5-2-3 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98% of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]

relationship to the reference method" and must be approved by the U.S. EPA.

8. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
9. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
11. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
12. In 1989, the ARB converted the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: California Air Resources Board, 6/7/2012

2. Federal Clean Air Act Amendments

The federal Clean Air Act Amendments of 1990 required that the EPA review all national AAQS in light of currently known health effects, including modifying existing standards or promulgating new standards where appropriate. EPA subsequently developed standards for chronic ozone exposure (8+ hours per day) and for very small diameter particulate matter ($PM_{2.5}$). New national AAQS were adopted in 1997 for these pollutants.

In response to continuing evidence that ozone exposure at levels just meeting federal clean air standards is demonstrably unhealthful, EPA proposed a further strengthening of the 8-hour standard. Draft standards were published in 2010 with an 8-hour standard of 0.065 ppm. Environmental organizations generally approved of the proposal; however, most manufacturing, transportation, or power generation groups opposed the new standard as economically unwise in an uncertain fiscal climate. In recognition of the fact that a stronger ozone standard could adversely impact employment, the draft proposal was placed on indefinite hold. EPA did propose and adopt a revised annual $PM_{2.5}$ standard that may require a revision to the basin-wide fine particulate attainment plan.

As part of EPA's 2002 consent decree on clean air standards, a further review of airborne particulate matter (PM) and human health was initiated. A substantial modification of federal clean air standards for PM was promulgated in 2006. Standards for $PM_{2.5}$ were strengthened, a new class of PM in the 2.5- to 10-micron size was created, some PM_{10} standards were revoked, and a distinction between rural and urban air quality was adopted. In December 2012, the federal annual standard for $PM_{2.5}$ was reduced from 15 µg/m³ to 12 µg/m³ which matches the California AAQS. The severity of the basin's non-attainment status for $PM_{2.5}$ may be increased by this action and thus require accelerated planning for future $PM_{2.5}$ attainment. The Clean Air Act defines "non-attainment" as a locality where air pollution levels persistently exceed national AAQS.

3. California Air Resources Board

In 2002, the CARB recommended adoption of the statewide $PM_{2.5}$ standard that is more stringent than the federal standard. This recommendation was based on evaluation of the most current data on the health effects of inhalation of fine particulate matter. However, the state standard does not have a specific attainment planning requirement such as a federal clean air standard. The state requirement is for continued progress towards attainment.

In 2005, CARB extensively evaluated health effects of ozone exposure and adopted a new state standard for an 8-hour ozone exposure which aligned with the federal 8-hour standard. The state 8-hour standard of 0.07 parts per million (ppm) is more stringent than the federal standards of 0.075 ppm. As with the $PM_{2.5}$ standard, there is no specific attainment deadline. State jurisdictions are required to make progress towards attaining state standards, but there are no consequences of non-attainment. At the same time, CARB adopted an annual state standard for nitrogen dioxide (NO_2) which is more stringent than the federal standard.

A new federal one-hour standard for NO_2 was adopted in 2010 that is more stringent than the existing state standard. Based on air quality monitoring data in the SCAB, the CARB has requested the EPA to designate the basin as "in attainment" for this standard. The federal standard for sulfur dioxide (SO_2) was also recently revised. However, with minimal combustion of coal and mandatory use of low sulfur fuels in California, SO_2 is typically not a problem pollutant.

4. Air Quality Management Plan

The federal CAAA of 1977 required that designated agencies in any area of the nation not meeting national clean air standards must prepare a plan demonstrating the steps that would bring the area into compliance. The SCAB was unable to meet deadlines for ozone, nitrogen dioxide, carbon monoxide, or PM_{10}. The agencies designated by the Governor to develop regional air quality plans within the SCAB are the SCAQMD and the Southern California Association of Governments (SCAG). The first Air Quality Management Plan (AQMP) was adopted by these agencies in 1979. However, attainment forecasts were overly optimistic and the Plan was revised several times.

The federal CAAA of 1990 required that all states with air-sheds with "serious" or worse ozone problems submit a revision to the State Implementation Plan (SIP). Over the past decade, revisions and amendments to the SIP have been approved. The most current attainment emissions forecast for ozone precursors – i.e., reactive organic gases (ROG) and oxides of nitrogen (NO_X) and for carbon monoxide (CO) and particulate matter are shown in Table 5-2-4. Substantial reductions of ROG, NO_X and CO are forecast to continue throughout the next several decades. PM_{10} and $PM_{2.5}$ are forecast to slightly increase unless new particulate control programs are implemented.

Table 5-2-4 South Coast Air Basin Emissions Forecasts

	Emissions per Day (tons)			
Pollutant	**2008** [a]	**2010** [b]	**2015** [b]	**2020** [b]
NO_X	917	836	667	561
ROG	632	596	545	525
CO	3,344	3,039	2,556	2,281
PM_{10}	308	314	328	340
$PM_{2.5}$	110	110	111	113

[a] 2008 base year
[b] With current emissions reduction programs and adopted growth forecasts.
Source: California Air Resources Board, California Emissions Projection Analysis Model, 2009

In 2003, the AQMD adopted an updated AQMP, which was approved by the EPA in 2004. The AQMP outlined the air pollution measures needed to meet federal health-based standards for ozone by 2010 and for particulates by 2006. The AQMP was based on the federal one-hour ozone standard, which was revoked late in 2005 and replaced by an 8-hour federal standard, which action initiated a new air quality planning cycle.

Re-designation of the air basin as non-attainment for the 8-hour ozone standards resulted in a new attainment plan being developed. The plan shifted most of the one-hour ozone standard attainment strategies to the 8-hour standard. The attainment date was changed from 2010 to 2021. The plan includes strategies for ultimately meeting the federal $PM_{2.5}$ standard.

Because projected attainment by 2021 requires control technologies that do not yet exist, the SCAQMD requested a voluntary "bump-up" from a "severe non-attainment" area to an "extreme non-attainment" designation for ozone, allowing a longer time for the technologies to develop. Without attainment, EPA would have been required to impose sanctions on the region if the bump-up had not been approved. In April 2010, EPA approved the change in designation to "extreme," thus setting a later attainment deadline. This reclassification also requires the air basin to adopt even more stringent emissions controls.

In other air quality attainment plan reviews, EPA has disapproved part of the SCAB $PM_{2.5}$ attainment plan included in the AQMP. EPA has stated that the current attainment plan relies on $PM_{2.5}$ control regulations that have not yet been approved or implemented. It is expected that a number of rules that are pending approval will remove the identified deficiencies. If these issues are not resolved within the next several years, federal funding sanctions for transportation projects could result. The recently adopted 2012 AQMP being readied for CARB submittal to EPA as part of California's SIP is expected to remedy identified $PM_{2.5}$ planning deficiencies.

The federal CAAA requires that non-attainment air basins have EPA-approved attainment plans in place. This requirement includes the federal one-hour ozone standard even though that standard was revoked approximately seven years ago. There was no approved attainment plan for the one-hour federal standard at the time of revocation. However, the SCAQMD is legally required to develop an AQMP for the long-since-revoked one-hour federal ozone standard.

Projects such as the proposed Esperanza Hills do not directly relate to the AQMP in that there are no specific air quality programs or regulations governing general development. However, the SCAQMD does not favor designating regional impacts as less than significant simply because the proposed development is consistent with regional growth projections. Air quality impact significance for the Proposed Project was, therefore, analyzed on a project-specific basis.

5.2.3 Thresholds of Significance

The State of California encourages local agencies to adopt their own thresholds, but it is not required. The County of Orange utilizes the thresholds of significance found in Appendix G of the CEQA Guidelines for air quality, which states:

> Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:
>
> a) Conflict with or obstruct implementation of the applicable air quality plan?
> b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
> c) 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)?
> d) Expose sensitive receptors to substantial pollutant concentrations?
> e) Create objectionable odors affecting a substantial number of people?

Air quality impacts can be categorized as either primary or secondary. Primary pollutant impacts can generally be evaluated directly in comparison to appropriate clean air standards. Violations of these standards where they are currently met, or a measurable worsening of an existing or future violation, would be considered a significant impact.

Secondary pollutants, by comparison, require time to transform from a more benign form to a more unhealthful contaminant. The impact occurs regionally far from the source. Analysis of significance of such emissions is based on a specified amount of emissions (e.g., pounds, tons) even though there is no way to translate those emissions directly into a corresponding ambient air quality impact.

In addition to the Appendix G thresholds listed above, the SCAQMD has established significance thresholds based on Section 182(e) of the federal Clean Air Act that identify levels of volatile organic gases from stationary sources operating in extreme non-attainment regions for ozone at 10 tons per year. These established values were converted into threshold levels of pounds per day for the construction and operational phases of a project. The SCAQMD states that any project located in the SCAB having daily emissions from direct and indirect sources that exceed the emissions thresholds should be considered significant.

Table 5-2-5 below depicts threshold levels for direct construction emissions and indirection operations emissions.

Table 5-2-5 Daily Emissions Thresholds

Pollutant	Construction (pounds per day)	Operations (pounds per day)
ROG	75	55
NO_X	100	55
CO	550	550
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
Lead	3	3

Source: SCAQMD CEQA Air Quality Handbook, November, 1993 Rev.

Additional significance thresholds identified by SCAQMD are:

- Project could interfere with the attainment of the federal or state ambient air quality standards by either violating or contributing to an existing or projected air quality violation.
- Project could result in population increases within the regional statistical area which would be in excess of that projected in the AQMP and in other than planned locations for the project's build-out year.
- Project could generate vehicle trips that cause a CO hot spot.

The 1993 SCAQMD CEQA Handbook also identifies various secondary significance criteria related to toxic, hazardous, or odorous air contaminants. No secondary impact indicators are associated with short-term or long-term project conditions. Recently adopted policies for $PM_{2.5}$ emissions require the gradual conversion of on-road delivery fleets and off-road heavy equipment to low-NO_X and low-$PM_{2.5}$ emissions alternatives, or the use of "clean" diesel if the emissions are demonstrated to be as low as those required by Tier 4 standards. Because health risks from toxic air contaminants (TACs) are cumulative over an assumed 70-year lifespan, measurable off-site public health risk from diesel TAC exposure would occur for only a brief construction portion of a project's lifetime, and only in dilute quantity.

2. Sensitive Receptors

The Air Quality Analysis combined the existing background air quality levels and potential impacts from the Proposed Project and then compared the results to the applicable air quality standards. These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare, particularly for those people most susceptible to further respiratory distress. These population groups include asthmatics, the elderly, very young children, people already weakened by other disease or illness and persons engaged in strenuous work or exercise and are called, collectively, sensitive receptors. Healthy adults can generally tolerate occasional exposure to air pollutant levels considerably above the minimum standards before adverse effects result. However, recent research has shown that chronic exposure to ozone (the primary ingredient in photochemical smog) may lead to adverse respiratory health even at concentrations close to the ambient standard.

As previously noted, sensitive receptors include young children, the elderly and the acutely and chronically ill, especially those with cardio-respiratory disease. Residential areas are considered to be sensitive to air pollution exposure because they may be occupied for extended periods and residents may be outdoors when exposure is highest. Schools are also considered to be sensitive receptors. Air quality impacts are analyzed relative to this population group with the greatest sensitivity to air pollution exposure.

Several development options are being considered for this project, each with a different main access roadway. Proximity to access/egress roadways for access Option 1 and access Option 2 is shown below:

Option	Access Roadway	Distance to Closest Home
1	Stonehaven Drive	50 feet to receiver
2	Aspen Way	50 feet to receiver

3. Localized Significance Thresholds

Localized significance thresholds (LSTs) are analysis parameters developed by SCAQMD to evaluate ambient air quality on a local level in addition to the more regional emissions-based thresholds of significance. LSTs were developed in response to the SCAQMD Governing Board's Environmental Justice Enhancement Initiative 1-4. The LST methodology was provisionally adopted in October 2003 and formally approved by SCAQMD's Mobile Source Committee in February 2005.

Use of an LST analysis for a project is optional. LSTs are only applicable to the following criteria pollutants: oxides of nitrogen (NO_X), carbon monoxide (CO) and particulate matter (PM_{10} and $PM_{2.5}$). Daily thresholds are 100 pounds NO_X, 500 pounds CO, 150 pounds PM_{10}, and 55 pounds $PM_{2.5}$. The primary source of possible LST impact for the Proposed Project would be during construction.

5.2.4 Project Impacts Prior to Mitigation

Local air quality impacts/emissions are usually divided into short-term and long-term impacts. Short-term impacts are normally the result of demolition, construction, or grading operations. Long-term impacts are associated with the built-out condition of the Proposed Project and are the result of day-to-day operation and maintenance, use of consumer products, natural gas use, and vehicle trips associated with residents, visitors, and employees.

1. Construction Emissions

Construction emissions are difficult to quantify since the exact type and amount of equipment that will be used or the acreage that may be disturbed on any given day is not known with any reasonable certainty. The emphasis in environmental documents relative to construction activity emissions impacts has therefore been to minimize the emissions as fully as possible through comprehensive mitigation, even if the exact amount of emissions cannot be precisely quantified.

Dust is typically the primary concern during construction of new homes and infrastructure but because such emissions are not amenable to collection and discharge through a controlled source, they are called “fugitive emissions.” Because of the inherent uncertainty in the predictive factors for estimating fugitive dust generation, regulatory agencies typically use one universal “default” factor based on the area disturbed assuming that all other input parameters into emission rate prediction fall into midrange average values. Average daily PM_{10} emissions during site grading and other disturbance average about 10 pounds per acre. This estimate presumes the use of “reasonably available control measures.” The SCAQMD requires the use of “best available control measures” for fugitive dust from construction activities which can reduce fugitive dust emissions to 1 to 2 pounds per day per acre disturbed.

Current research in particulate-exposure health suggests that the most adverse effects derive from ultra-small diameter particulate matter comprised of chemically reactive pollutants such as sulfates, nitrates, or organic material. A national clean air standard for particulate matter of 2.5 microns or smaller was adopted in 1997. $PM_{2.5}$ emissions are estimated to comprise 10% to 20% of PM_{10}.

Construction activities also generate many larger particles with shorter atmospheric residence times than the fine particles that remain suspended semi-indefinitely. This dust is comprised mainly of large diameter inert silicates that are chemically non-reactive and are readily filtered out by human breathing passages. The dust particles create more of a soiling nuisance as they settle on cars, furniture or landscape foliage than an adverse health hazard. Under normal wind conditions, the deposition distance of most soiling nuisance particulates is less than 100 feet from the source. Most adjacent sensitive receptors are further than 100 feet from the Proposed Project construction site perimeter. Existing uses closer than 100 feet will only have construction activities in close proximity for a short period of time.

In addition to dust, exhaust emissions will result from the operation of on-site and off-site heavy equipment. Because the types and numbers of equipment will vary, emissions cannot be quantified with certainty. Two grading options were evaluated for the Proposed Project, each requiring varying amount of grading based on a conservative travel distance, because it is anticipated that most export hauling will occur in close proximity to development areas. No earthworks are anticipated to require on-road hauling. The estimated volume of earthworks is shown in Table 5-2-6 below. Distance from the borrow site to the center of the development site is indicated in the table. The grading quantities and haul distance indicated below were modeled to determine all construction emissions associated with project grading.

Table 5-2-6 Earthworks Quantities and Distance Estimates

Option	Borrow Site (Bridal Hills)	Distance to Borrow Site
1	286,700 cubic yards	1,000 feet
2	730 cubic yards	1,700 feet

While project build-out will depend strongly on market demand, it was assumed that each project construction task would be continuous and sequential for purposes of the Air Quality Analysis. This provides a worst case air quality scenario, as daily emissions would be higher than if they were spread out over a longer period of time.

The model used to calculate construction and operational emissions is CalEEMod which was developed by SCAQMD for residential land use projects. The model calculates the daily maximum and the annual average emissions for criteria pollutants as well as total or annual GHG emissions, which are discussed further in Section 5.6, Greenhouse Gas Emissions (beginning on page 5-257). The CalEEMod 2011.1.1 computer model was used to calculate emissions from the prototype construction equipment fleet and schedule anticipated by CalEEMod for a residential land use consisting of 378 residential units. This includes 340 units in the Proposed Project and 38 potential units in the adjoining Bridal Hills, LLC parcel. The 38 units are not included in the Proposed Project, but it is reasonable to assume that they will be built in the future. By adding the units, a worst case analysis can be presented.

Table 5-2-7 below shows CalEEMod's default equipment fleet with the addition of several scrapers and a grader to the grading phase to ensure an accurate and conservative analysis. Activity duration estimates were provided by the Project Applicant. CalEEMod defaults are included in the Appendix C of the Air Quality Analysis (Appendix C to this DEIR).

Table 5-2-7 CalEEMod Equipment Fleet

Clearing (120 days)	4 Tractors/loaders/backhoes 3 Dozers
Grading (260 days)	2 Excavators 1 Dozer 2 Graders 6 Scrapers 2 Tractors/loaders/backhoes
Construction (1,000 days)	1 Crane 3 Forklifts 1 Generator set 3 Tractors/loaders/backhoes 1 Welder
Paving (120 days)	2 Pavers 2 Paving equipment 2 Rollers

Using the equipment fleet indicated above as a worst case scenario required dust mitigation measures which have been included in the mitigation section herein. However, it is unlikely that all equipment will be in use at the same time. The mitigation measures applied to construction equipment for the "with mitigation" scenario include the best available construction management practices.

The CalEEMod construction model demonstrated the unmitigated and mitigated emissions for an assumed eight-year construction scenario as shown in Table 5-2-8 and Table 5-2-9 below. It should be noted that the application of some mitigation measures have trade-offs in pollutant reductions and, therefore, may result in increases of some pollutants (CalEEMod User Guide, SCAQMD, February 2011, pages 34-35). Therefore, in some cases, the mitigated emissions for CO are slightly higher than unmitigated emissions.

In September 2010, CARB announced that its methods used to estimate the load factors for off-road equipment were incorrect and led to an overestimate of emissions by a factor of 33%. CARB is currently revising the model, which has not yet been released. Therefore, the off-road equipment emissions load factors were adjusted in CalEEMod to account for a 33% reduction attributable to the overestimation of load factors.

One model run for each of the two development options was prepared. Emissions associated with Option 1 are presented in Table 5-2-8, and emissions associated with Option 2 are provided in Table 5-2-9. Only the first two years, where grading is assumed to occur, vary to account for the different grading scenarios. The model runs used consistent amounts of 735 cubic yards per day for grading. In addition, the modeling assumed the following:

- Option 1 – 16-cubic-yard trucks equating to 46 round trips per day based on the total grading amount
- Option 2 – Less than 1 truck trip per day based on the grading amount

Table 5-2-8 Construction Activity Emissions, Option 1

Maximal Construction Emissions	Maximum Daily Emissions (pounds per day)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2014						
Unmitigated	15.6	128.2	69.7	0.1	21.1	12.4
Mitigated	12.2	59.6	81.9	0.1	12.8	6.3
2015						
Unmitigated	14.8	118.4	66.5	0.1	20.6	8.2
Mitigated	12.1	58.5	80.6	0.1	12.7	2.8
2016						
Unmitigated	3.9	24.0	25.9	0.1	3.5	1.4
Mitigated	3.9	24.0	25.9	0.1	3.5	1.4
2017						
Unmitigated	3.6	21.9	25.0	0.1	3.3	1.2
Mitigated	3.6	21.9	25.0	0.1	3.3	1.2
2018						
Unmitigated	3.3	20.0	24.2	0.1	3.2	1.1
Mitigated	3.3	20.0	24.2	0.1	3.2	1.1
2019						
Unmitigated	3.1	18.3	23.5	0.1	3.1	0.9
Mitigated	3.1	18.3	23.5	0.1	3.1	0.9
2020						
Unmitigated	44.7	16.7	22.9	0.1	2.9	1.1
Mitigated	44.7	16.7	22.9	0.1	2.9	1.1
2021						
Unmitigated	44.6	1.6	2.8	0.0	0.5	0.1
Mitigated	44.6	1.6	2.8	0.0	0.5	0.1
SCAQMD Thresholds	**75**	**100**	**550**	**150**	**150**	**55**

Source: CalEEMod.2011.1.1 output in appendix *[to Air Quality and Greenhouse Gas Emissions Impact Analysis dated July 12, 2013]*, includes on-road materials delivery as well as construction crew commuting

Table 5-2-9 Construction Activity Emissions, Option 2

Maximal Construction Emissions	Maximum Daily Emissions (pounds per day)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2014						
Unmitigated	14.9	122.2	64.2	0.1	20.8	12.4
Mitigated	11.5	53.7	76.4	0.1	9.7	6.3
2015						
Unmitigated	14.1	112.4	61.4	0.1	12.6	8.1
Mitigated	11.4	52.4	75.7	0.1	4.7	2.7
2016						
Unmitigated	3.9	24.0	25.9	0.1	3.5	1.4
Mitigated	3.9	24.0	25.9	0.1	3.5	1.4
2017						
Unmitigated	3.6	21.9	25.0	0.1	3.3	1.2
Mitigated	3.6	21.9	25.0	0.1	3.3	1.2
2018						
Unmitigated	3.3	20.0	24.2	0.1	3.2	1.1
Mitigated	3.3	20.0	24.2	0.1	3.2	1.1
2019						
Unmitigated	3.1	18.3	23.5	0.1	3.1	0.9
Mitigated	3.1	18.3	23.5	0.1	3.1	0.9
2020						
Unmitigated	44.7	16.7	22.9	0.1	2.9	1.1
Mitigated	44.7	16.7	22.9	0.1	2.9	1.1
2021						
Unmitigated	44.6	1.6	2.8	0.0	0.5	0.1
Mitigated	44.6	1.6	2.8	0.0	0.5	0.1
SCAQMD Thresholds	**75**	**100**	**550**	**150**	**150**	**55**

Source: CalEEMod.2011.1.1 output in appendix *[to Air Quality and Greenhouse Gas Emissions Impact Analysis dated July 12, 2013]*, includes on-road materials delivery as well as construction crew commuting

As shown in the tables, equipment emissions could exceed the SCAQMD thresholds for NO_X during project grading. The assumption that the entire site will be graded at once is speculative since phasing will be driven by market demand. However, the use of new or recently retrofit diesel equipment could reduce daily NO_X emissions to less than significant levels. Mitigation measures are included herein to reduce emissions for either Option 1 or Option 2.

2. Sensitive Receptors

Construction equipment exhaust contains carcinogenic compounds within the diesel exhaust particulates. The toxicity of diesel exhaust is evaluated relative to a 24-hour per day, 365 days per year, 70-year lifetime exposure. The SCAQMD does not generally require the analysis of construction-related diesel emissions relative to health risk due to the short period for which the majority of diesel exhaust would occur, specifically during the grading phase and over a period of several months.

Giroux and Associates prepared a Health Risk Assessment (Assessment) to evaluate construction-related emissions. The Assessment is for Option 1 Project access, which has the largest quantity of soil movement of the access options and, therefore, represents the worst case emissions from truck hauling and heavy machinery to move the earthworks. The following table depicts the thresholds for such pollutants.

Table 5-2-10 Risks and Hazards Construction-Related Significance Thresholds

Pollutant	Construction-Related Threshold
Risks and hazards	Increased cancer risk of >10.0 in a million
TACs (toxic air contaminants) and $PM_{2.5}$	Increased non-cancer risk of >1.0 Hazard Index (Chronic or Acute)
Individual project	Ambient $PM_{2.5}$ increase: >0.3 μg/m^3 annual average

The health risk assessment consisted of a screening-level individual cancer analysis to determine the maximum $PM_{2.5}$ concentration from diesel exhaust. This concentration was combined with the diesel particulate matter (DPM) exposure unit risk factor to calculate the inhalation cancer risk from project-related construction activities at the closest sensitive receptor. The EPA AERSCREEN air dispersion model was used to evaluate concentrations of DPM and $P_{2.5}$. This is a single source model that provides a maximum one-hour ground level concentration.

Combustion emissions from construction equipment would be generated during Project construction and could expose adjacent sensitive receptors to DPM and other toxic air contaminants. DPM exhaust emissions for on-site Project construction from off-road heavy equipment were calculated using the CalEEMod 2013.2.2 computer model, which estimated all construction activities over approximately eight years, excluding weekends and holidays.

The predicted maximum one-hour DPM concentration is 0.085 μg/m^3 resulting from on-site total project DPM emissions of 0.96 tons. The hourly to annual scaling factor is 0.1. AERSCREEN output indicates that project construction will produce a maximum annual DPM concentration of 0.085 μg/m^3. This is less than the individual project $PM_{2.5}$ significance threshold of 0.3 μg/m^3.

The excess individual cancer risk factor for DPM exposure is approximately 300 in one million per 1 μg/m^3 of lifetime exposure. Recent research has determined that young children are substantially more sensitive to DPM exposure risk. If exposure occurs in the first several years of life, an age sensitivity factor (ASF) of 10 should be applied. For toddlers through mid-teens, the ASF is 3. The DPM exposure risk from construction exhaust thus depends on the age of the receptor population as shown below.

Table 5-2-11 Age Sensitivity Factor Thresholds

Age Group	Excess Cancer Risk*
Infants	3.0 in 1 million
Children	0.9 in 1 million
Adults	0.3 in 1 million

*DPM (μg/m^3) * ASF * 300 x 10^{-6}/70 years

As indicated, the maximum individual cancer risk would be below the ten in one million significance threshold and, therefore, no impacts to sensitive receptors would occur with the Proposed Project. Since there is no risk under Option 1 conditions, which represents the worst case for the amount of grading and heavy equipment use, no analysis was performed for other access options. The model output for the analysis is included with the Assessment in Appendix C.

The Proposed Project will be phased over a grading period of at least two years. Health risk analyses are typically assessed over a 9-, 30- or 70-year time frame due to the lack of health risk associated with such a brief exposure.

3. Localized Significance Thresholds (Construction Phase)

Parameters for localized significance thresholds (LSTs) were developed by SCAQMD to evaluate ambient air quality on a local level. LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standards, and are developed based on the ambient concentrations of that pollutant for each source receptor area and distance to the nearest sensitive receptor. The SCAQMD has published LST pollutant concentration data for 1, 2 and 5 acres sites for varying distances. 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 5-2-12 below was used to determine the maximum daily disturbed-acreage for comparison to LSTs.

Table 5-2-12 Maximum Daily Disturbed Acreage

Equipment Type	Acres per 8-hour-day
Tractors	0.5
Graders	0.5
Rubber tired dozers	0.5
Scrapers	1

Using the equipment identified in Table 5-2-12 above, the Proposed Project will result in a maximum of 7.5 acres per day disturbed during peak construction grading activity (1 dozer × 0.5 + 2 graders × 0.5 + 6 scrapers × 1 = 7.5 acres disturbed). CalEEMod calculates emissions based on the number of equipment hours and the maximum daily soil disturbance activity possible for each piece of equipment.

The SCAQMD screening tables for construction disturbance of five acres and less can be used as screening criteria for larger projects to determine whether or not dispersion modeling may be required. If emissions exceed the LST screening value for a five-acre site, then dispersion modeling must be conducted. Use of the five-acre site model would result in more stringent LSTs since emissions would occur in a more concentrated area and closer to the nearest sensitive receptors than would be likely with the Proposed Project.

The residential use nearest to the closest project residential lot is approximately 600 feet (200 meters). LST screening tables are available for 25, 50, 100, 200, and 500 meter source-receptor distances. Only on-site construction activity is considered in the LST analysis. Construction emissions in the CalEEMod output files do not include sources such as on-road haul, worker commuting, or vendor delivery emissions, which are included herein in the microscale impact analysis. Table 5-2-13 below depicts the thresholds and emissions (pounds per day) for the LST analysis.

Table 5-2-13 Localized Significance Thresholds and Project Emissions

	Localized Significance Thresholds and Project Emissions (pounds per day)			
	CO	NO_X	PM_{10}	$PM_{2.5}$
LST Thresholds (5 acres/200 meters)	3,605	249	78	34
Max On-Site Emissions				
Option 1				
Unmitigated	70	128	21	12
Mitigated	81	60	13	6
Option 2				
Unmitigated	64	122	21	12
Mitigated	76	54	10	6

CalEEMod Output in appendix *[to Air Quality and Greenhouse Gas Emissions Impact Analysis dated July 12, 2013]* (maximum mitigated emissions from on-site construction)

As seen above, LST impacts for the maximum daily construction activities for Option 1 and Option 2 are less than significant. Since LST thresholds will not be exceeded for the more conservative concentrated 5-acre disturbance assumption, they would also not be exceeded if the same emissions are dispersed over a larger project area.

4. Operational Emissions

The Proposed Project will generate 3,617 average daily trips (ADT). Residential uses also generate small quantities of area source emissions derived from organic compounds from consumer products, natural gas use, and landscape maintenance. The contribution of these sources is relatively small.

In the table below, operation emissions were calculated using CalEEMod 2011.1.1 for assumed project build-out year of 2018. Actual project build-out will likely not occur until 2020-2021. CalEEMod assumes that mobile source emissions will become cleaner in the future due to technology and fuel formulation improvements. Therefore, use of 2018 as a build-out year represents a worst case scenario. Build-out occurring in subsequent years will have lower associated operational emissions.

The calculations assume there will be no wood-burning fireplaces in order to minimize smoke and unburned hydrocarbon emissions. With wood-burning fireplaces, ROG emissions could exceed operational thresholds. Therefore, no wood-burning fireplaces were used in the Air Quality Analysis.

Table 5-2-14 Proposed Residential Daily Operational Impacts

Source	Operational Emissions (pounds per day)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Area	16.6	0.4	31.8	0.0	0.6	0.6
Energy	0.5	4.0	1.7	0.0	0.3	0.3
Mobile	15.6	35.4	148.1	0.3	37.6	2.3
Total	**32.6**	**39.8**	**181.7**	**0.3**	**38.6**	**3.2**
SCAQMD Threshold	55	55	550	150	150	55
Exceeds Threshold?	no	no	no	no	no	no

Source: CalEEMod Output in appendix [to Air Quality and Greenhouse Gas Emissions Impact Analysis dated July 12, 2013]

Mitigation has been included in Section 5.6, Greenhouse Gas Emissions (beginning on page 5-257) to ensure use of gas rather than wood-burning fireplaces. With use of gas-burning hearths and the elimination of wood-burning fireplaces, project development will not exceed the SCAQMD recommended threshold levels and operational emissions will be less than significant.

5. Microscale Impact Analysis

CO is a localized gas that dissipates very quickly under normal meteorological conditions. As such, CO concentrations decrease substantially as distance from the source (intersection) increases. Since exhaust fumes from vehicles are the primary source of CO, there is a relationship between traffic/circulation congestion and CO impacts. Intersections are areas of the highest CO concentrations and have the potential to create pockets of elevated levels of CO which are called "hot spots."

Even though the SCAB has been classified a non-attainment area, the SCAQMD has demonstrated in the CO attainment redesignation request to EPA that there are no "hot spots" – i.e., locations where emission concentrations expose individuals to elevated risks of adverse health effects – anywhere in the SCAB. However, a CO screening analysis was performed at all intersections within the Project Area that were included in the project traffic analysis. One-hour CO concentrations were calculated on the sidewalks adjacent to those intersections. Calculations were made for existing traffic and future timeframes for the morning and evening peak hours.

The significance of localized project impacts depends on whether the project would cause substantial concentrations of CO. The project-related mobile-source emissions would have significant impacts if they exceed the California one-hour and eight-hour CO standards which are:

- 1-hour = 20 ppm
- 8-hour = 9 ppm

Calculations were made for existing and future conditions during morning and evening peak hours. Combining future project built-out traffic with existing conditions represents a worst-case analysis. The results of the microscale (emissions that typically range from 1 to 999 μm – 1 mm) impact analysis are shown for Option 1 and

Option 2 under 1-hour and 8-hour periods. The results are depicted in Table 5-2-15 for the 1-hour concentration and Table 5-2-16 for the 8-hour concentration.

Table 5-2-15 One-Hour CO Concentrations

Intersections	1-Hour CO Concentrations, including 2.7 ppm background concentration (parts per million)					
Option 1	**Existing No Project**	**Existing + Option 1**	**2020 No Project**	**2020 + Option 1**	**Future No Project**	**Future + Option 1**
AM Peak Hours						
Yorba Linda Boulevard/						
Las Palomas	3.4	3.5	3.2	3.2	3.0	3.0
San Antonio Road	3.5	3.6	3.2	3.3	3.1	3.1
Yorba Ranch	3.5	3.6	3.2	3.3	3.1	3.1
La Palma	4.0	4.1	3.7	3.7	3.4	3.5
PM Peak Hours						
Yorba Linda Boulevard/						
Las Palomas	3.5	3.6	3.2	3.3	3.0	3.1
San Antonio Road	3.5	3.6	3.3	3.3	3.1	3.1
Yorba Ranch	3.6	3.6	3.3	3.3	3.1	3.2
La Palma	4.3	4.4	3.8	3.9	3.7	3.7
Option 2	**Existing No Project**	**Existing + Option 2**	**2020 No Project**	**2020 + Option 2**	**Future No Project**	**Future + Option 2**
AM Peak Hours						
Yorba Linda Boulevard/						
Las Palomas	3.4	3.5	3.2	3.2	3.0	3.0
San Antonio Road	3.5	3.6	3.2	3.3	3.1	3.1
Yorba Ranch	3.5	3.5	3.2	3.3	3.1	3.1
La Palma	4.0	4.1	3.7	3.7	3.4	3.5
PM Peak Hours						
Yorba Linda Boulevard/						
Las Palomas	3.5	3.6	3.2	3.3	3.0	3.1
San Antonio Road	3.5	3.7	3.3	3.3	3.1	3.1
Yorba Ranch	3.6	3.6	3.3	3.3	3.1	3.1
La Palma	4.3	4.4	3.8	3.8	3.7	3.7

Table 5-2-16 Eight-Hour CO Concentrations

Intersections	8-Hour CO Concentrations, including 2.1 ppm background concentration (parts per million)					
Option 1	**Existing No Project**	**Existing + Option 1**	**2020 No Project**	**2020 + Option 1**	**Future No Project**	**Future + Option 1**
Yorba Linda Boulevard/						
Las Palomas	2.6	2.6	2.4	2.4	2.3	2.3
San Antonio Road	2.6	2.6	2.4	2.5	2.3	2.3
Yorba Ranch	2.6	2.6	2.4	2.5	2.3	2.4
La Palma	4.0	4.1	3.7	3.7	3.4	3.5
Option 2	**Existing No Project**	**Existing + Option 2**	**2020 No Project**	**2020 + Option 2**	**Future No Project**	**Future + Option 2**
Yorba Linda Boulevard/						
Las Palomas	2.6	2.6	2.4	2.4	2.3	2.3
San Antonio Road	2.7	2.7	2.4	2.5	2.3	2.3
Yorba Ranch	2.6	2.6	2.4	2.5	2.3	2.3
La Palma	3.0	3.0	2.7	2.7	2.6	2.6

As shown in the tables above, the existing peak one-hour local CO background level in 2011 was 3.5 ppm. Under existing conditions with the addition of the Proposed Project, maximum one-hour concentration is estimated to be 4.4 ppm, which is well below the one-hour standard of 20 ppm. The maximum ambient 8-hour CO concentration in 2011 was 3.0 ppm. Maximum with-project 8-hour CO concentration is 3.0 ppm, which is well below the 9 ppm significance threshold. Therefore, microscale air quality impacts are not significant.

5.2.5 Mitigation Measures

a. Short-Term Impacts (Construction)

Project-related air quality impacts were shown to be potentially significant during project grading due to off-road diesel equipment NO_X emissions. PM_{10} (fugitive dust and equipment exhaust soot) emissions are predicted to remain below the SCAQMD CEQA significance threshold. However, the anticipated duration for construction and the large volume of earthworks requires the use of best management practices for dust control. To further minimize potential impacts, during construction and grading activities the construction contractor shall ensure that standard construction practices set forth in the SCAQMD Handbook shall be implemented.

AQ-1 During construction, the Project Applicant shall ensure the use of enhanced control measures for diesel exhaust emissions to maintain NO_X impacts at a less than significant level. These measures shall include:

- Utilize well-tuned off-road construction equipment
- During grading, require that contractors use Tier 3 on all heavy equipment (excavators, graders, and scrapers exceeding 100 HP rated power) if the entire

project is graded at one time for NO_X emissions, unless use of such mitigation is demonstrated to be technically infeasible for a given piece of equipment

- During grading, require that contractors employ oxidation catalysts during grading for excavation graders and scrapers exceeding 100 HP rated power if the entire project is graded at one time, unless use of such mitigation is demonstrated to be technically infeasible for a given piece of equipment.
- Enforce 5-minute idling limits for on-road trucks and off-road equipment

AQ-2 During construction, the Project Applicant shall ensure that standard construction practices as set forth in the SCAQMD Handbook shall be implemented.

AQ-3 During construction, the Project Applicant shall ensure that best management practices for dust control are implemented. These include:

- Apply soil stabilizers or moisten areas that are inactive for 96 hours or more.
- Prepare a high wind dust control plan
- Address previously disturbed areas if subsequent construction is delayed more than 96 hours
- Water exposed surfaces as needed to avoid visible dust leaving the construction site (typically three times per day)
- Wet down or cover all stockpiles with tarps at the end of each day or as needed
- Provide water spray during loading and unloading of earthen materials
- Minimize in-out traffic from construction zone
- Cover all trucks hauling dirt, sand or loose material or require all trucks to maintain at least two feet of freeboard
- Sweep streets daily if visible soil material is carried out from the construction site
- Use perimeter sandbags and wind fences for erosion control

b. Long Term (Operational) Impacts

With incorporation of the following mitigation measure, operational emissions would not exceed respective SCAQMD significance thresholds.

5.2.6 Level of Significance after Mitigation

The SCAQMD and the CARB are the agencies responsible for the management of air quality impacts within the South Coast Air Basin. The SCAB has been designated as a non-attainment area for compliance with the Federal Clean Air Act. However, the Proposed Project will not conflict with or obstruct implementation of the applicable air quality plan.

As shown in the analysis herein, project construction or operational emissions will not exceed the SCAQMD recommended thresholds levels and, therefore, will not violate any air quality standard or contribute substantially to an existing or project air quality violation. Short-term construction-related emissions are anticipated to remain below thresholds but could result in a cumulative net increase in pollutants if the adjacent proposed Cielo Vista project is constructed concurrently.

Distance attenuation from the nearest sensitive receptors will lessen potential impacts from short-term construction or long-term operation of the Proposed Project. Mitigation measures have been included to ensure that emissions and dust from construction operations are minimized to the extent feasible. Other than short-term impacts from construction operations, the Proposed Project will not create objectionable odors, as only residential uses will be developed.

5.2.7 Cumulative Impacts

Because the SCAB has been classified as a non-attainment air basin for compliance with the federal Clean Air Act, the Proposed Project will have an incremental impact on cumulative air quality conditions. Emissions modeling for the construction of the Proposed Project indicate that the project emissions would remain below levels of significance for each of the air quality constituents for which the SCAB is currently non-attainment. Therefore, the project would not significantly add to the cumulative impacts or increases in the non-attainment criteria pollutants in the SCAB. The Proposed Project, when combined with the proposed adjacent Cielo Vista project, is not anticipated to result in cumulative impacts to air quality, because the anticipated emissions, with mitigation, are well below the established thresholds.

5.2.8 Unavoidable Adverse Impacts

Project impacts related to short-term construction and long-term operation will remain below the SCAQMD thresholds. No unavoidable adverse impacts will occur related to air quality.