Section 3.2
Air Quality

This section presents the air quality analysis conducted for the proposed project. The analysis that follows includes a description of the existing conditions of the project site and surrounding area, the regulatory framework that guides the decision-making process, thresholds for determining if the proposed project would result in a significant impact, potential air quality impacts, mitigation measures where necessary to reduce the severity of potentially significant impacts, and the level of significance after mitigation. The potential for cumulative impacts is also discussed. Emission calculations and air quality modeling results are provided in Appendix C.

3.2.1 Introduction

This section summarizes the potential impacts to air quality associated with the construction and operation of the proposed project. This analysis includes the preparation of emissions inventories for construction and operations, a screening-level carbon monoxide (CO) hot spots analysis, an evaluation of impacts on sensitive receptors, and an evaluation of the proposed project's consistency with the South Coast Air Quality Management District's (SCAQMD's) *Air Quality Management Plan* (AQMP) in accordance with the procedures established in the SCAQMD's *CEQA Air Quality Handbook*.

This analysis discusses criteria pollutants and toxic air contaminants (TACs). Criteria pollutants, which are regulated by human health-based permissible levels (hence, "criteria"), include six common pollutants: ozone (O_3) (commonly known as "smog"), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), CO, particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb). Table 3.2-1 summarizes health effects associated with these pollutants.

Table 3.2-1 Criteria Pollutants and Their Effect on Health

Pollutant	Characteristics	Health Effects	Major Sources
O_3	A highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (reactive organic gases[(1)] and nitrogen oxides).	▪ Cough, chest tightness, pain upon taking a deep breath ▪ Worsening of wheezing and other asthma symptoms ▪ Reduced lung function ▪ Increased hospitalizations for respiratory causes	Pollutants emitted from vehicles, factories, and other industrial sources, fossil fuels combustion, consumer products, and evaporation of paints.
NO_2	Reactive, oxidizing gas formed during combustion.	▪ Respiratory symptoms ▪ Episodes of respiratory illness ▪ Impaired lung functioning	High-temperature combustion processes, such as those occurring in trucks, cars, and power plants.
SO_2	Colorless gas with a pungent odor.	▪ Wheezing, shortness of breath, and chest tightness ▪ Pulmonary symptoms and disease ▪ Decreased pulmonary function ▪ Increased risk of mortality	Sulfur-containing fuel burned by locomotives, ships, and off-road diesel equipment or industrial sources like petroleum refining and metal processing.

Pollutant	Characteristics	Health Effects	Major Sources
CO	Odorless, colorless gas that is highly toxic. Formed by the incomplete combustion of fuels.	▪ Impairment of oxygen transport in the bloodstream. ▪ Aggravation of cardiovascular disease. ▪ Fatigue, headache, dizziness.	Carbon-containing fuels like gasoline or wood.
PM_{10} and $PM_{2.5}$	Small particles that measure 10 microns or less are termed PM_{10} (fine particles less than 2.5 microns are $PM_{2.5}$). Solid and liquid particles of dust, soot, aerosols, smoke, ash, and pollen and other matter that are small enough to remain suspended in the air for a long period.	▪ Increased risk of hospitalization for lung and heart-related respiratory illness. ▪ Increased risk of premature deaths. ▪ Reduced lung function. ▪ Increased respiratory symptoms and illnesses.	Burning fuels like gasoline, oil, diesel or wood ($PM_{2.5}$) and windblown dust (PM_{10}).
Lead (Pb)	Soft and resilient metal	▪ Impaired blood formation and nerve conduction. ▪ Fatigue, anxiety, short-term memory loss, depression, weakness in extremities, and learning disabilities in children. ▪ Cancer.	Various industrial activities.

Sources: California Air Resources Board (CARB) 2008; CARB 2009a; CARB 2009b; CARB 2009c; CARB 2009d; CARB 2011a.
Note:
(1)CARB uses the term "reactive organic gases," which is similar to the term "volatile organic compounds" used by the United States Environmental Protection Agency but with different exempt compounds (CARB 2009e). For this analysis, the terms are used interchangeably.
Key: O_3 = ozone; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; CO = carbon monoxide; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter

A TAC is an air pollutant that can cause or contribute to an increase in mortality or serious illness or that may pose another potential hazard to human health. Several common TACs associated with mobile sources, such as passenger vehicles and construction equipment, include toluene, xylenes, acrolein, and diesel particulate matter (DPM).

This section discusses potential impacts from both construction activities and operations. Construction-related impacts include emissions from construction equipment during the short-term construction period. Construction-related emissions were compared to the SCAQMD's significance thresholds. For operational-related impacts, this analysis provides a comparison between the air quality conditions that currently exist without the proposed project (i.e., existing conditions in 2013) and air quality conditions projected to occur in the future with implementation of the proposed project in 2016. The operational impact analysis includes emissions from natural gas usage, reapplication of architectural coatings, use of consumer products, and any changes in vehicular traffic. For operational emissions, the difference between the proposed project and existing conditions (i.e., the project increment) was compared to significance thresholds developed by the SCAQMD.

3.2.2 Existing Conditions

The analysis includes construction and operation of the proposed project located in the City of Pasadena (Pasadena or City), within Los Angeles County. California is divided into 15 air basins based

on common geographic and political boundaries. The South Coast Air Basin (SCAB) covers the portion of Los Angeles County in which the proposed project is located. The SCAQMD has jurisdiction for local air quality impacts in the South Coast portion of Los Angeles County.

The climate of the SCAB is determined primarily by terrain and geography. Regional meteorology is dominated by a persistent high-pressure area that commonly resides over the eastern Pacific Ocean. Seasonal variations in strength and position of this pressure cell cause changes in area weather patterns. Warm summers, mild winters, infrequent rainfall, moderate daytime on-shore breezes, and moderate humidity characterize local climactic conditions. The SCAB's normally mild climate is occasionally interrupted by periods of hot weather, winter storms, and hot easterly Santa Ana winds.

The SCAB area has high levels of air pollution, particularly from June through September. Factors leading to high levels of pollution include a large amount of pollutant emissions, light winds, and shallow vertical atmospheric mixing. These factors reduce pollutant dispersion, exacerbating elevated air pollution levels. Pollutant concentrations in the SCAB vary by location, season and time of day. Concentrations of O_3, for example, tend to be lower along the coast and in far inland areas of the basin and adjacent desert and higher in and near inland valleys.

Air quality conditions are typically the result of meteorological conditions and existing emission sources in an area. Over the past 30 years, substantial progress has been made in reducing air pollution levels in Southern California. Table 3.2-2 summarizes air quality data from a monitoring station near the area of analysis. This analysis used monitoring data from the SCAQMD's West San Gabriel Valley station, which is the closest monitoring station to the project site, for most pollutants; however, the East San Gabriel Valley, South San Gabriel Valley, and East San Fernando Valley stations were used for pollutants not monitored in the Pasadena area. These stations best represent air quality conditions at the project area; or, in the case of O_3, best represent air quality conditions for the region.

Table 3.2-2 Summary of Pollutant Monitoring Data

Criteria Pollutant and Station Location	Annual Monitoring Data		
	2009	2010	2011
O_3			
West San Gabriel Valley			
Maximum 1-Hour Concentration	0.176	0.101	0.107
Maximum 8-Hour Concentration	0.114	0.081	0.084
Fourth High 8-Hour Concentration	0.095	0.075	0.077
Days Above 1-Hour CAAQS (0.09 ppm)	12	1	5
Days Above 8-Hour CAAQS (0.070 ppm)	19	6	13
Days Above 8-Hour NAAQS (0.075 ppm)	12	3	5
NO_2 (1)			
West San Gabriel Valley			
Maximum 1-Hour Concentration (ppb)	80	71.0	87.3
98th Percentile 1-Hour Concentration (ppb)	60	63.0	72.8
Annual Average Mean (ppb)	22.1	19.6	20.3
SO_2 (2)			
East San Fernando Valley			

Criteria Pollutant and Station Location	Annual Monitoring Data		
	2009	2010	2011
Maximum 1-Hour Concentration (ppb)	10	14.9	9.0
Maximum 24-Hour Concentration (ppb)	3	4.1	5.2
CO [3]			
West San Gabriel Valley			
Maximum 1-Hour Concentration (ppm)	4	3	*
Maximum 8-Hour Concentration (ppm)	2.1	2.0	2.2
PM_{10} [4],[5]			
East San Gabriel Valley			
Maximum 24-Hour Concentration (µg/m^3)	74	70	65
Annual Average Mean (µg/m^3)	32.0	29.8	32.7
Days Above NAAQS (150 µg/m^3)	0	0	0
Days Above CAAQS (50 µg/m^3)	7 (13.5%)	5 (9.1%)	9 (15%)
$PM_{2.5}$ [6],[7]			
West San Gabriel Valley			
Maximum 24-Hour Concentration (µg/m^3)	52.0	35.2	43.8
98th Percentile 24-Hour Concentration (µg/m^3)	35.7	24.0	29.8
Annual Average Mean (µg/m^3)	12.3	10.2	10.8
Days Above NAAQS (35 µg/m^3)	3 (2.8%)	0	1 (1.0%)
Pb [8]			
South San Gabriel Valley			
Maximum Monthly Average (µg/m^3)	0.04	0.02	*
Maximum Quarterly Average (µg/m^3)	0.02	0.01	*

Source: SCAQMD 2013

Notes:

[1] The NO_2 federal 1-hour standard is 100 ppb and the annual standard is 0.0534 ppm (5.34 ppb). The state 1-hour and annual standards are 0.18 ppm (180 ppb) and 0.030 ppm (30 ppb).

[2] The federal 1-hour standard is 75 ppb (0.075 ppm). The state standards are 1-hour average SO_2 > 0.25 ppm (250 ppb) and 24-hour average SO_2 > 0.04 ppm (40 ppb).

[3] The federal 8-hour standard (9 ppm) and state 8-hour standard (9.0 ppm) were not exceeded. The federal and state 1-hour standards (35 ppm and 20 ppm) were not exceeded either.

[4] Federal reference method (FRM) PM_{10} samples were collected every 6 day.

[5] Federal annual average mean (AAM) PM_{10} standard (50 µg/m^3) was revoked in 2006. State standard is AAM > 20 µg/m^3.

[6] $PM_{2.5}$ samples were collected every 3 days.

[7] Federal annual $PM_{2.5}$ standard is AAM> 15.0 µg/m^3. State standard is AAM > 12.0 µg/m^3.

[8] Federal Pb standard is 3-months rolling average > 0.15 µg/m^3; state standard is monthly average ≥ 1.5 µg/m^3.

Key: * = data not available; µg/m^3 = micrograms per cubic meter; CAAQS = California ambient air quality standards; O_3 = ozone; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; CO = carbon monoxide; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter

The area of analysis is designated as a nonattainment area for the O_3, PM_{10}, $PM_{2.5}$, and Pb National ambient air quality standards (NAAQS) and California ambient air quality standards (CAAQS) and for the NO_2 CAAQS. The area is also designated as a maintenance area for the NO_2 and CO NAAQS. It is designated as an attainment area for all other pollutants. Table 3.2-3 summarizes the attainment status for the area of analysis.

Table 3.2-3 State and Federal Attainment Status

Pollutant	State Status	Federal Status
O_3	Nonattainment, Extreme[(1)]	Nonattainment, Extreme
NO_2	Nonattainment	Maintenance
SO_2	Attainment	Attainment
CO	Attainment	Maintenance
PM_{10}	Nonattainment	Nonattainment, Serious
$PM_{2.5}$	Nonattainment	Nonattainment
Pb	Nonattainment	Nonattainment

Source: CARB 2011b; USEPA 2012; 40 Code of Federal Regulations (CFR) 81.305.
Note:
(1) Classification is for the 1-hour O_3 CAAQS only.
Key:
O_3 = ozone; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; CO = carbon monoxide; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter

3.2.3 Regulatory Framework

Air quality management and protection responsibilities exist in federal, state, regional, and local levels of government. The Federal Clean Air Act (CAA) and California Clean Air Act (CCAA) are the primary statutes that establish ambient air quality standards and establish regulatory authorities to enforce regulations designed to attain those standards.

3.2.3.1 Federal

The U.S. Environmental Protection Agency (USEPA) is responsible for implementation of the CAA. The Air Pollution Control Act of 1955 was the first federal legislation involving air pollution. This Act provided funds for federal research in air pollution. The enactment of the CAA of 1963 was the first federal legislation regarding air pollution control. The CAA was amended in 1965, 1967, 1970, 1977, 1990, and 1997. Under authority of the CAA, the USEPA is required to set NAAQS for the following criteria pollutants: O_3, NO_2, SO_2, CO, PM_{10}, $PM_{2.5}$, and Pb.

Table 3.2-4 presents the current NAAQS for the criteria pollutants. Primary standards are designed, with an adequate margin of safety, to protect the public health. Secondary standards define levels of air quality that are necessary to protect the public welfare from any adverse effects. Secondary standards include protections against decreased visibility and damage to animals, crops, vegetation, and buildings. O_3 is a secondary pollutant, meaning that it is formed in the atmosphere from reactions of other precursor compounds under certain conditions. Primary precursor compounds that lead to formation of O_3 include volatile organic compounds (VOC) and nitrogen oxides (NOx). $PM_{2.5}$ can be emitted directly from sources (e.g., engines) or can form in the atmosphere from other precursor compounds. $PM_{2.5}$ precursor compounds in the SCAB include sulfur oxides (SOx), NOx, VOC, and ammonia.

Table 3.2-4 National Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS Primary	NAAQS Secondary	Violation Criteria
O_3	8 Hour	0.075 ppm (147 µg/m^3)	Same as Primary Standard	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
NO_2	1 Hour	100 ppb (188 µg/m^3)	N/A	98th percentile, averaged over 3 years
	Annual	53 ppb (100 µg/m^3)	Same as Primary Standard	Annual mean
SO_2	1 Hour	75 ppb (196 µg/m^3)	N/A	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	3 Hour	N/A	0.5 ppm (1,300 µg/m^3)	Not to be exceeded more than once per year
	24 Hour	0.14 ppm (366 µg/m^3)[(1)]	N/A	Not to be exceeded more than once per year
	Annual	0.030 ppm (79 µg/m^3)[(1)]		Annual mean
CO	1 Hour	35 ppm (40 mg/m^3)	N/A	Not to be exceeded more than once per year
	8 Hour	9 ppm (10 mg/m^3)		
PM_{10}	24 Hour	150 µg/m^3	Same as Primary Standard	Not to be exceeded more than once per year on average over 3 years
$PM_{2.5}$	24 Hour	35 µg/m^3	Same as Primary Standard	98th percentile, averaged over 3 years
	Annual	12.0 µg/m^3[(2)]	15.0 µg/m^3	Annual mean, averaged over 3 years
Pb	Rolling 3-Month Average[(3)]	0.15 µg/m^3	Same as Primary Standard	Not to be exceeded

Source: CARB 2012.

Notes:

(1) On June 22, 2010, the 24-hour and annual primary SO_2 NAAQS were revoked (75 FR 35520). The 1971 SO_2 NAAQS (0.14 parts per million [ppm] and 0.030 ppm for 24-hour and annual averaging periods) remain in effect until one year after an area is designated for the 2010 1-hour primary standard. The USEPA is not currently prepared to propose designation action in California and is deferring action related to area designations (USEPA 2013).

(2) On January 15, 2013, the USEPA published a final rule to lower the annual primary $PM_{2.5}$ NAAQS to 12.0 µg/m^3. The final rule was effective on March 15, 2013 (78 Federal Register [FR] 3086).

(3) The Pb NAAQS was revised on November 12, 2008 to a rolling 3-month average (73 FR 66964). The 1978 Pb NAAQS (1.5 µg/m^3 as a quarterly average) remained in effect until one year after an area is designated for the 2008 standard. On December 31, 2010, final area designations for the 2008 Pb standards became effective; therefore, the 1978 Pb NAAQS is no longer in effect in California (75 FR 71033).

Key:

µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; N/A = not applicable; NAAQS = National Ambient Air Quality Standard; O_3 = ozone; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; CO = carbon monoxide; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ppb = parts per billion; ppm = parts per million

The Federal CAA requires states to classify air basins (or portions thereof) as either attainment or nonattainment with respect to criteria air pollutants, based on whether the NAAQS have been achieved, and to prepare State Implementation Plans (SIPs) containing emission reduction strategies to maintain the NAAQS for those areas designated as attainment and to attain the NAAQS for those areas designated as nonattainment.

3.2.3.2 State

The CCAA substantially added to the authority and responsibilities of the State's air pollution control districts. The CCAA establishes an air quality management process that generally parallels the Federal process. The CCAA, however, focuses on attainment of the CAAQS that, for certain pollutants and averaging periods, are typically more stringent than the comparable NAAQS. Table 3.2-5 summarizes the CAAQS.

Table 3.2-5 California Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	Violation Criteria
O_3	1 Hour	0.09 ppm (180 µg/m^3)	Not to be exceeded
	8 Hour	0.070 ppm (137 µg/m^3)	
NO_2	1 Hour	0.18 ppm (339 µg/m^3)	Not to be exceeded
	Annual	0.030 ppm (57 µg/m^3)	
SO_2	1 Hour	0.25 ppm (655 µg/m^3)	Not to be exceeded
	24 Hour	0.04 ppm (105 µg/m^3)	
CO	1 Hour	20 ppm (23 mg/m^3)	Not to be exceeded
	8 Hour	9.0 ppm (10 mg/m^3)	
PM_{10}	24 Hour	50 µg/m^3	Not to be exceeded
	Annual	20 µg/m^3	
$PM_{2.5}$	Annual	12 µg/m^3	Not to be exceeded
Pb	30-Day Average	1.5 µg/m^3	Not to be equaled or exceeded
Visibility Reducing Particles	8 Hour	See Footnote 1	Not to be exceeded
Sulfates	24 Hour	25 µg/m^3	Not to be equaled to exceeded
Hydrogen sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Not to be equaled or exceeded
Vinyl chloride	24 Hour	0.01 ppm (26 µg/m^3)	Not to be equaled or exceeded

Source: CARB 2012.

Note:

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

Key:

µg/m^3 = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standard; mg/m^3 = milligrams per cubic meter; N/A = not applicable; O_3 = ozone; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; CO = carbon monoxide; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ppm = parts per million

The CCAA requires that air districts prepare an air quality attainment plan if the district violates CAAQS for O_3, NO_2, SO_2 or CO. No locally prepared attainment plans are required for areas that violate the PM_{10} CAAQS. The air quality attainment plan requirements established by the CCAA are based on the severity of air pollution problems caused by locally generated emissions. Upwind air pollution

control districts are required to establish and implement emission control programs commensurate with the extent of pollutant transport to downwind districts.

The CCAA requires that the CAAQS be met as expeditiously as practicable, but does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards.

The California Air Resources Board (CARB) is responsible for developing emission standards for on-road motor vehicles and some off-road equipment in the state. In addition, CARB develops guidelines for the local districts to use in establishing air quality permit and emission control requirements for stationary sources subject to the local air district regulations.

3.2.3.3 Regional and Local

South Coast Air Quality Management District

The SCAQMD has jurisdiction over an area of 10,743 square miles consisting of Orange County, the non-desert portions of Los Angeles, Riverside and San Bernardino Counties, and the Riverside County portion of the Salton Sea Air Basin and Mojave Desert Air Basin. The SCAB is a sub-region within SCAQMD's jurisdiction covering an area of 6,745 square miles. The sub-region includes the City of Pasadena and the surrounding communities. While air quality in this area has improved in recent years, activity in the basin requires more regulation to meet ambient air quality standards.

The SCAQMD has adopted a series of AQMPs to meet the CAAQS and NAAQS. These plans require, among other emissions-reducing activities, control technology for existing sources; control programs for area sources and indirect sources; a permitting system designed to ensure no net increase in emissions from any new or modified permitted sources of emissions; transportation control measures; sufficient control strategies to achieve a five percent or more annual reduction in emissions (or 15 percent or more in a three-year period) for VOC, NOx, CO, and PM_{10}; and demonstration of compliance with CARB's established reporting periods for compliance with air quality goals.

The current, USEPA-approved SIPs for each federal nonattainment or maintenance pollutant in the SCAB are summarized below:

- O_3 – no federally approved SIP (1-hour and 8-hour)
- NO_2 – SIP approved by USEPA on July 24, 1998 (63 FR 39747), based on the *1997 AQMP*. In this SIP approval, USEPA also re-designated the SCAB from nonattainment to attainment/maintenance for NO_2.
- CO – *2005 Maintenance Plan* and Request for Re-Designation to attainment status, approved by USEPA on May 11, 2007 (72 FR 26718)
- PM_{10} – *2009 South Coast PM10 Redesignation Request and Maintenance Plan*, approved by USEPA on June 26, 2013 (78 FR 38223)
- $PM_{2.5}$ – *2007 AQMP*, partially approved by USEPA on November 9, 2011 (76 FR 69928). In this approval, the USEPA approved in part and disapproved in part SIP revisions to provide for attainment of the 1997 $PM_{2.5}$ NAAQS.

On June 1, 2007, SCAQMD adopted a comprehensive update, the *2007 AQMP* for the SCAB. The *2007 AQMP* outlines air pollution control measures needed to meet federal O_3 and $PM_{2.5}$ standards. The *2007 AQMP* was approved by CARB and submitted to USEPA for its final approval on September 27, 2007. The USEPA recently approved in part and disapproved in part the *2007 AQMP* (76 FR 69928). The SCAQMD adopted the *2012 AQMP* on December 7, 2012 and CARB approved the *2012 AQMP* on January 25, 2013. CARB submitted the *2012 AQMP* to the USEPA for approval on February 13, 2013 (CARB 2013).

The SCAQMD also developed the *2012 Lead SIP* to demonstrate attainment of the Pb NAAQS before December 31, 2015. The *2012 Lead SIP* was adopted by the SCAQMD Governing Board on May 4, 2012.

The SCAQMD also adopts rules to implement portions of the AQMP. Rule 403 requires the implementation of best available fugitive dust control measures during active construction activities capable of generating fugitive dust emissions from on-site earth-moving activities, construction/demolition activities, and construction equipment travel on paved and unpaved roads.

City of Pasadena General Plan

The City of Pasadena General Plan contains policies to guide the future growth of the City. The specific policies that are related to air quality in the 2004 Land Use Element (City of Pasadena 2004) are as follows:

- Objective 18 – Improved Environment: Improve the quality of the environment for Pasadena and the region.
  - Policy 18.1 – Air Quality: Improve the air quality in Pasadena and in the region.

It should be noted that the City also was a participating City in the 1992 West San Gabriel Valley Air Quality Plan. This plan has been implemented through the City's General Plan, and no individual policies of the West San Gabriel Valley Air Quality Plan are applicable to the proposed project.

3.2.4 Methodology

This section describes the methodology used to develop the emission inventories and the comparison of the analysis results to the significance thresholds presented in Section 3.2.5. Emissions of VOCs, NOx, SO_2, CO, PM_{10}, and $PM_{2.5}$ were estimated for criteria pollutants. Lead emissions were not estimated because no major sources of lead would be used at the project site.

Construction of the proposed project would generate some criteria pollutant emissions due to off-road construction equipment exhaust, ground-disturbing activity, and on-road vehicle exhaust from vendor and haul trucks and construction employee commuting. During operation, vehicles entering and exiting the project site would generate the majority of emissions. Emissions were estimated using the California Emissions Estimator Model (CalEEMod), Version 2013.2.2 (CAPCOA 2013). CalEEMod is a statewide land use emissions computer model that estimates construction and operational emissions from a variety of land use projects.

Emissions from building construction activities were modeled using a 28-month construction schedule commencing with demolition in August 2014 and ending in November 2016. The construction equipment list, phase duration, project area, and excavated material was provided by the City. Default data from CalEEMod for equipment size (i.e. horsepower) and daily hours of operation

were used. Where there were updated load factors available from CARB in the 2011 Inventory Model for In-Use Off-Road Equipment, default CalEEMod load factors were replaced (CARB 2011c). Consistent with SCAQMD fugitive dust control measures in Rule 403, water trucks were assumed to control fugitive dust emissions. Construction emissions also include default vehicles for construction employee commute, vendor trips, and haul trucks to dispose of 30,000 cubic yards (cy) of soil (including 620 cy of debris from demolition of the existing parking lot) and to import an additional 500 cubic yards of soil.

The land uses associated with the proposed project include 5,000 square feet of retail space; 71,980 square feet of mid-rise apartments (including ancillary functions like the lobby and gym); 0.5 acres of paved area (which includes 20 additional parking spaces); and a 146-space underground parking structure. Default parameters for these land uses were used in CalEEMod to estimate operational emissions from architectural coating, consumer products, landscaping, and energy (i.e., natural gas) use. Operational vehicular emissions were calculated based on future trip rates presented in the traffic analysis (KOA Corporation 2013). Operational emissions were assumed to occur beginning in December 2016.

Potential air quality impacts to sensitive receptors due to CO hotspots were analyzed using a screening method developed by the Bay Area Air Quality Management District (BAAQMD) (1999). Additional details on the analysis are provided in subsequent portions of this section.

The effects of TACs emitted from the proposed project, as well as the impacts of nearby sources of TACs, were also evaluated in this analysis.

3.2.5 Thresholds of Significance

Impacts on air quality would be considered potentially significant if the proposed project would:

- Conflict with implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any nonattainment criteria pollutant;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

Regional Emission Thresholds

To assess whether a proposed project would violate any air quality standard or contribute substantially to an existing or projected air quality violation, the SCAQMD developed significance thresholds for mass daily emission rates of criteria pollutants for both construction and operational sources (SCAQMD 1993). Regular updates are published on the SCAQMD website (SCAQMD 2011a). These thresholds are summarized in Table 3.2-6.

Table 3.2-6 SCAQMD Significance Thresholds

Pollutant	Construction (lb/day)	Operation (lb/day)
VOC	75	55
NOx	100	55
SOx	150	150
CO	550	550
PM_{10}	150	150
$PM_{2.5}$	55	55
Pb	3	3

Source: SCAQMD 2011a

Key: lb/day = pounds per day; VOC = volatile organic compounds; NOx = nitrogen oxides; SOx = sulfur oxides; CO = carbon monoxide; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; Pb = lead;

Localized Significance Thresholds

To assess whether a proposed project would expose sensitive receptors to substantial pollutant concentrations, the SCAQMD developed localized significance thresholds (LSTs) for NOx, CO, $PM_{10,}$ and $PM_{2.5}$ (2008). Table 3.2-7 summarizes the screening-level emission thresholds for construction emissions for a project located in the West San Gabriel Valley Source-Receptor Area, where sensitive receptors are located 25 meters of the project site. LSTs consider ambient concentrations of pollutants for each source receptor area and distances to the nearest sensitive receptor. Existing residences are located immediately to the north and east of the project site. The City's Central Park is located south of the project site with a children's playground immediately to the south. The closest receptor that could be present for more than an hour would be across the street from the proposed project at approximately 25 meters (i.e., approximately 82 feet); therefore, the thresholds for 25 meters were used.

Table 3.2-7 Localized Significance Thresholds (Screening-Level)

Pollutant	Construction (lb/day)	Operation (lb/day)
NOx	69	69
CO	535	535
PM_{10}	4	1
$PM_{2.5}$	3	1

Source: SCAQMD 2009

Key: NOx = nitrogen oxides; CO = carbon monoxide; lb/day = pounds per day; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter

3.2.6 Project Impacts

Would the project conflict with implementation of the applicable air quality plan?

The *2012 AQMP* was prepared by the SCAQMD in conjunction with CARB, the Southern California Association of Governments (SCAG), and the USEPA. The *2012 AQMP* was prepared to demonstrate how the region would comply with the federal 8-hour O_3 and $PM_{2.5}$ NAAQS by the mandated attainment dates. The *2012 AQMP* incorporates growth projections into its analysis; therefore, if a project can demonstrate that it is consistent with the land use plan used to develop the growth forecast, then it would not conflict with implementation of the AQMP. The *2012 AQMP* is based on growth projections included in SCAG's adopted *2012-2035 RTP/Sustainable Communities Strategy*

(SCS). The City is projected to have a population of 143,400 with 58,400 households in 2020 (SCAG 2012). The proposed project would add 161 residents and 64 residential units and would not cause the growth projections in the *2012 AQMP* and *2012-2035 RTP/SCS* to be exceeded. As such, the proposed project would not conflict with the implementation of the adopted AQMP.

Mitigation Measures

No mitigation is required.

Residual Impacts

No conflicts with the adopted AQMP would occur with implementation of the proposed project.

Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

The SCAQMD has published regional significance thresholds to determine if projects have significant air quality impacts. These significance thresholds were used to evaluate whether the proposed project would violate any air quality standard or contribute substantially to an existing or projected air quality violation. If the proposed project were to exceed these thresholds, it would be considered to have a significant impact on air quality.

Construction Emissions

Construction emissions are expected to occur from engine exhaust from the off-road construction equipment and vehicle trips made by construction workers, vendors, and haul trucks. These emissions would primarily consist of CO, NOx, PM_{10}, $PM_{2.5}$, SO_2, and reactive organic gases (ROG).[1] In addition, earth disturbance activities from grading and paved road dust would result in fugitive dust emissions; architectural coating and paving activities would result in ROG emissions.

Construction of the proposed project is expected to start with demolition in August 2014 and last for 28 months. As previously discussed, emissions were estimated using CalEEMod, Version 2013.2.2. Default assumptions were used unless project-specific emissions were provided. It was assumed that the building construction and architectural coatings phases would overlap, as would the architectural coatings and paving phases. On- and off-road exhaust, fugitive dust, architectural coating, and paving emissions were estimated directly by CalEEMod. Details of the assumptions and emission calculation methodologies are presented in Appendix C.

Table 3.2-8 summarizes the estimated maximum daily construction emissions based on a 28-month demolition and construction schedule.

[1] ROGs and VOCs are designations made by CARB and USEPA, respectively, for organic compounds that can react with NOx in the presence of sunlight to form O_3. Slight variations exist between the two designations; however, for the purposes of this analysis they are assumed the same.

Table 3.2-8 Demolition and Construction Emissions Summary

Source[1]	Maximum Daily Construction Emissions (lbs/day)					
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition	2	24	16	<1	2	1
Site Preparation	2	14	11	<1	1	1
Grading	7	92	51	<1	5	4
Building Construction	2	14	16	<1	2	1
Architectural Coating	10	2	3	<1	<1	<1
Paving	1	9	7	<1	1	1
Maximum Daily Emissions[1]	**11**	**92**	**51**	**<1**	**5**	**4**
Regional Construction Threshold	75	100	550	150	150	55
Significant?	No	No	No	No	No	No

Note:
[1] Maximum daily ROG emissions would occur during the overlap of building construction and architectural coatings in 2016
Key: "<" = less than; CO = carbon monoxide; lbs/day = pounds per day; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ROG = reactive organic gases; SO_2 = sulfur dioxide.

As shown in Table 3.2-8, maximum daily construction emissions would not exceed the regional significance thresholds for any pollutant; therefore, the proposed project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation, as such construction emissions would be less than significant.

Operational Emissions

Operational emissions would occur from routine building maintenance, energy consumption, and vehicular trips to and from the proposed project. As with construction-related activities, operational emissions were estimated using CalEEMod, Version 2013.2.2. Emissions were estimated for area sources including the reapplication of architectural coatings, landscaping activities, hearths, and the usage of consumer products. Emissions from natural gas combustion for space heating were also estimated.

Additionally, vehicle trips that would be generated by the proposed project would create emissions along surrounding local streets and highways. Emissions were calculated for the traffic increase predicted by the traffic analysis conducted for the proposed project (KOA Corporation 2013). As shown in Table 3.2-9, operational vehicle emissions would not exceed SCAQMD thresholds; therefore, the proposed project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation, as such operation of the proposed project would be less than significant.

Table 3.2-9 Operational Emissions Summary

Source	Maximum Daily Operational Emissions (lbs/day)					
	ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Mobile	3	8	29	<1	5	1
Natural Gas Combustion	<1	<1	<1	<1	<1	<1
Architectural Coatings	1	<1	<1	<1	<1	<1
Consumer Products	3	<1	<1	<1	<1	<1
Hearths	<1	<1	<1	<1	<1	<1
Landscaping	<1	<1	5	<1	<1	<1
Total Daily Emissions[1]	**7**	**8**	**35**	**<1**	**5**	**1**

Regional Operations Threshold	55	55	550	150	150	55
Significant?	No	No	No	No	No	No

Notes:
(1) Totals may not add exactly because of rounding.
Key: "<" = less than; CO = carbon monoxide; lbs/day = pounds per day; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ROG = reactive organic gases; SO_2 = sulfur dioxide

Mitigation Measures

No mitigation is required.

Residual Impacts

Less than significant air quality impacts are anticipated to occur with implementation of the proposed project.

Would the project result in a cumulatively considerable net increase of any nonattainment criteria pollutant?

According to the SCAQMD (2003), projects that do not exceed the regional significance thresholds are generally not considered cumulatively significant. As shown in Table 3.2-8 and Table 3.2-9, the construction and operational emissions of the nonattainment pollutants (PM_{10}, $PM_{2.5}$, and O_3 precursors [NOx and VOC]), would be less than the SCAQMD significance thresholds. Therefore, proposed project would not result in a cumulatively considerable net increase of any nonattainment criteria pollutant, as such the cumulative impact from the proposed project construction and operation would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Less than significant cumulative air quality impacts are anticipated to occur with implementation of the proposed project.

Would the project expose sensitive receptors to substantial pollutant concentrations?

Localized Significance Thresholds

To assess whether a proposed project would expose sensitive receptors to substantial pollutant concentrations, the SCAQMD developed thresholds for local air quality impacts from construction and operational activities (SCAQMD 2008 and 2009). LST screening-level emission tables were developed by the SCAQMD for projects up to five acres. For construction impacts, the SCAQMD recommends using the equipment type to determine the maximum daily disturbed acreage when analyzing air emissions with CalEEMod (SCAQMD 2011b). Each crawler tractor, grader, or rubber-tired dozer operating at the project site could disturb 0.5 acres per workday; a scraper could disturb one acre per workday. The equipment list for the proposed project assumes that one crawler tractor would operate during the grading phase, which would indicate that 0.5 acres would be disturbed per day. However, the one acre LSTs were used because those are the smallest thresholds available.

LSTs are only applicable to the following criteria pollutants: NOx, CO, PM_{10}, and $PM_{2.5}$. While construction-related activities are compared to LSTs for all of the given pollutants, as described in the SCAQMD's LST Methodology (SCAQMD 2008), only on-site emissions were included in the LST

analysis and not off-site mobile emissions from the proposed project (e.g., haul and vendor trips or construction worker commuting). Table 3.2-10 summarizes the maximum daily on-site construction emissions. Table 3.2-11 summarizes the maximum daily on-site operational emissions.

Table 3.2-10 LST Analysis for Construction Emissions

Phase	Maximum Daily On-Site Construction Emissions (lbs/day)					
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition	2.2	21.1	13.3	<0.1	1.8	1.3
Site Preparation	1.6	11.9	8.8	<0.1	0.9	0.9
Grading	5.3	62.3	30.2	0.1	3.2	2.8
Building Construction	1.0	11.2	6.4	<0.1	0.7	0.6
Architectural Coatings	9.8	2.4	1.9	<0.1	0.2	0.2
Paving	0.9	9.1	6.4	<0.1	0.6	0.5
Maximum Daily Emissions [(1)]	**10.7**	**62.3**	**30.2**	**0.1**	**3.2**	**2.8**
LST (Construction)	n/a	69	535	n/a	4	3
Significant?	n/a	No	No	n/a	No	No

Notes:
[(1)] Maximum ROG emissions occur during the overlap of the architectural coatings and paving phases.
Key: CO = carbon monoxide; lbs/day = pounds per day; LST = localized significance threshold; N/A = not applicable; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ROG = reactive organic gases; SO_2 = sulfur dioxide

Table 3.2-11 LST Analysis for Operational Emissions

Source	Maximum Daily On-Site Operational Emissions (lbs/day)					
	ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Natural Gas Combustion	0.01	0.12	0.05	<0.01	0.01	0.01
Architectural Coatings	0.56	<0.01	<0.01	<0.01	<0.01	<0.01
Consumer Products	3.11	<0.01	<0.01	<0.01	<0.01	<0.01
Hearth	0.11	<0.01	0.01	<0.01	0.08	0.08
Landscaping	0.17	0.06	5.37	<0.01	0.03	0.03
Total Emissions	**3.97**	**0.18**	**5.43**	**<0.01**	**0.12**	**0.11**
LST (Operations)	n/a	69	535	n/a	1	1
Significant?	n/a	No	No	n/a	No	No

Key: CO = carbon monoxide; lbs/day = pounds per day; LST = localized significance threshold; N/A = not applicable; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ROG = reactive organic gases; SOx = sulfur oxides

As shown in Table 3.2-10 and Table 3.2-11, on-site construction and operational emissions would not exceed the respective LST thresholds; however, as shown in Table 3.2-10, $PM_{2.5}$ during project construction would nearly hit the 3.0 lbs/day threshold by generating an estimated 2.8 lbs/day. Therefore, in order to ensure $PM_{2.5}$ emissions remain below the 3.0 lbs/day threshold, mitigation would be incorporated. During project operations, the proposed project would not expose sensitive receptors to substantial pollutant concentrations. Therefore, localized air quality impacts would be less than significant.

CO Hotspots

Although the project area is designated as an attainment/maintenance area for CO, congested roadways and intersections can cause localized CO impacts, or "hotspots," that require additional

analysis. As previously discussed, potential air quality impacts to sensitive receptors due to CO hotspots were analyzed using a screening method developed by the BAAQMD (1999). This screening method is based on California Department of Transportation's (Caltrans') CALINE4 model and incorporates the worst case meteorological conditions (i.e., wind direction is parallel to the primary roadway and 90 degrees to the secondary road, wind speed of less than one meter per second and extreme atmospheric stability). A reference CO concentration, based on number of lanes, elevation, relative volume, and receptor distance, is scaled based on the intersection's hourly traffic volume and CO emission factor. An average CO emission factor was calculated using EMFAC2011 emission factors for all vehicle types in Los Angeles County. Projected future year 1- and 8-hour CO concentrations were estimated from data provided by the SCAQMD (2005).

Traffic data was provided by KOA Corporation (2013) for the following intersections:

- Fair Oaks Boulevard and Colorado Boulevard
- Fair Oaks Boulevard and Dayton Street
- Fair Oaks Boulevard and Del Mar Boulevard
- Raymond Avenue and Colorado Boulevard
- Raymond Avenue and Dayton Street
- Raymond Avenue and Del Mar Boulevard

CO concentrations at these intersections during morning and afternoon peak hour were estimated using this method for future (2016) with proposed project conditions. The estimated CO concentrations were compared against federal and state ambient air quality standards presented in Table 3.2-4 and Table 3.2-5. Table 3.2-12 summarizes the results of the screening-level CO hotspots analysis.

Table 3.2-12 CO Concentrations – With Cumulative and Project Traffic (2014)

Intersection	AM Peak Hour (ppm)		PM Peak Hour (ppm)	
	1-Hour[1]	8-Hour[2]	1-Hour[1]	8-Hour[2]
Fair Oaks Boulevard and Colorado Boulevard	7.5	5.4	7.7	5.6
Fair Oaks Boulevard and Dayton Street	7.4	5.4	7.5	5.5
Fair Oaks Boulevard and Del Mar Boulevard	7.7	5.6	7.8	5.7
Raymond Avenue and Colorado Boulevard	7.1	5.2	7.4	5.4
Raymond Avenue and Dayton Street	6.8	5.0	6.9	5.1
Raymond Avenue and Del Mar Boulevard	7.4	5.4	7.6	5.5

Notes:
[1] State standard is 20 ppm. Federal standard is 35 ppm.
[2] State and federal standard is 9 ppm.
Key: ppm = parts per million

As shown in Table 3.2-12, the CALINE4 screening procedure predicts that, under worst-case conditions, future CO concentrations at each intersection would not exceed the state 1-hour and 8-hour standards with the operation of the proposed project. No significant CO hotspot impacts would occur to sensitive receptors near these intersections and the proposed project would not expose

sensitive receptors to substantial pollutant concentrations. As a result, a less than significant impact relative to future CO concentrations would occur with implementation of the proposed project.

Toxic Air Contaminants

The SCAQMD recommends performing a detailed risk analysis for substantial sources of DPM. Some TACs would be emitted from the construction and operation of the proposed project, but the proposed project does not result in a substantial source of diesel-fueled trucks and equipment. Therefore, a risk analysis for TACs was not performed. Although the proposed project would not generate substantial quantities of TACs, the proposed project would be located within one-quarter mile of the Foothill Freeway/Interstate 210 and within one-half mile of State Route 134. As a result, the health effects of the freeway were analyzed in accordance with CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (2005). CARB recommends against siting new sensitive land use within 500 feet of a freeway. Sensitive land uses include, but are not limited to, residences, schools, day care centers, playgrounds, and medical facilities. Any land use that could expose persons vulnerable to health problems, inducing children, pregnant women, the elderly, and those with existing health problems, would be considered a sensitive land use. The proposed apartments would be located over 500 feet from the freeways; therefore, the proposed project would not expose sensitive receptors to substantial pollutant (TAC) concentrations, as such there are no conflicts with the proposed project location.

Mitigation Measures

Mitigation Measure (MM)-AQ-1: Construction Equipment Engine Requirements

The construction contractor shall ensure that off-road construction equipment be equipped with engines that meet the model year 2007 or Tier 3 emission standards for off-road compression-ignition (diesel) engines (13 CCR 2420-2425.1). Older model year engine may also be used if they are retrofit with a diesel particulate filter to reduce PM emissions to the applicable emission standards.

MM-AQ-2: Construction Equipment Limitations

The construction contractor shall ensure that the cumulative hours of operation for all off-road diesel equipment do not exceed 60 hours per day.

Residual Impacts

Less than significant air quality impacts are anticipated to occur with implementation of the proposed project.

Would the project create objectionable odors affecting a substantial number of people?

The use of diesel construction equipment during construction may generate near-field odors that are considered a nuisance. Diesel equipment emits a distinctive odor that may be considered offensive to certain individuals. Odors from construction activities would be temporary and would not affect a substantial number of people. Therefore, implementation of the proposed project construction would not create objectionable odors affecting a substantial number of people and a less than significant impact would occur.

Examples of land uses that could result in substantial odors include wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. The proposed project would not include the operation of any of those land uses. Although the proposed project would generate solid waste, it would be stored in covered containers in

compliance with the City's solid waste regulations. As a result, any odors associated with operation of the commercial uses and residences would be minimal and would not affect a substantial number of people. Therefore, a less than significant impact would occur.

Mitigation Measures

No mitigation is required.

Residual Impacts

Less than significant odor impacts are anticipated to occur with implementation of the proposed project.

3.2.7 Cumulative Impacts

According to the SCAQMD white paper *Potential Control Strategies to Address Cumulative Impacts from Air Pollution*, *Appendix D Cumulative Impact Analysis Requirements Pursuant to CEQA* (SCAQMD 2003), projects that do not exceed the significance thresholds are generally not considered to be cumulatively significant. Therefore, if mass daily emissions do not exceed the SCAQMD's significance threshold, then they would not be cumulatively considerable.

The City has analyzed a scenario in which a National Football League (NFL) team could temporarily play at the Rose Bowl while a permanent stadium is being built outside the City limits (City of Pasadena 2012). While the potential games from the NFL could overlap with operation of the proposed project, the maximum overlap is projected to be a maximum of 13 games in any one year and would last for a maximum of five years. As a result, this scenario would have a limited and temporary impact on cumulative air quality impacts. Because of the temporary duration of this scenario, cumulative impacts were analyzed with and without consideration of an NFL team so that the long term incremental effect of the proposed project could be segregated and disclosed for purposes of determining whether it was cumulatively considerable.

Scenario One (Excluding Project #26 from the Cumulative Projects List [Temporary Use of the Rose Bowl by the NFL])

While the potential games at the Rose Bowl as a result of the NFL team would overlap with operation of the proposed project, as noted above the maximum overlap is 13 games in any one year or football season for a maximum of five years; the overlap would occur no sooner than the 2013-2014 season. As a result, this scenario would have a limited and temporary impact on the proposed project. Because of the short duration of this activity, Scenario One analyzed cumulative impacts without consideration of an NFL team.

Independent from the NFL project, several projects could occur near the project vicinity that could contribute to cumulative air quality impacts. As described earlier, the SCAQMD considers projects that exceed the regional significance thresholds to be cumulatively considerable (SCAQMD 2003). However, construction and operational emissions from the proposed project would be less than these thresholds (see Table 3.2-8 and Table 3.2-9). As a result, the proposed project's incremental effect would not result in or contribute to the severity of cumulatively significant air quality impacts.

Scenario Two (Including Project #26from the Cumulative Projects List [Temporary Use of the Rose Bowl by the NFL])

Scenario Two analyzes a scenario where an NFL team would be playing games at the Rose Bowl. Operational emissions from motor vehicles traveling to the Rose Bowl would be cumulatively significant. As a result, the proposed project would be contributing to a cumulative air quality impact, but the cumulative effect arises almost solely from the NFL project on game days. While there would be a significant cumulative effect on air quality, the incremental operational emissions from the proposed project would be minimal (see Table 3.2-9), would not exceed regional significance thresholds, and the proposed project's incremental effect on the cumulative impact would not be cumulatively considerable.

Mitigation Measures

No mitigation is required.

Residual Impacts

Significant cumulative impacts are not anticipated to occur with implementation of the proposed project and related projects.