3.4 Air Quality

Introduction

This section describes the environmental and regulatory setting for air quality. It also describes impacts on air quality that would result from implementation of the Project and mitigation for significant impacts where feasible and appropriate. Cumulative impacts are discussed at the end of this section. Issues identified in response to the Notice of Preparation (NOP) (Appendix 1) were considered in preparing this analysis. Applicable issues that were raised pertain to worsened traffic congestion as a result of the Project and the corresponding air pollution impacts.

Existing Conditions

Regulatory Setting

Federal

Clean Air Act and National Ambient Air Quality Standards

The Clean Air Act (CAA) was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as National Ambient Air Quality Standards (NAAQS), and specifies future dates for achieving compliance. The CAA also mandates that the state submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that would most substantially affect the development of the Project include Title I (Nonattainment Provisions) and Title II (Mobile-Source Provisions).

Table 3.4-1 shows the NAAQS currently in effect for each criteria pollutant. The California Ambient Air Quality Standards (CAAQS) (discussed below) are also provided for reference.

Table 3.4-1. National and State Ambient Air Quality Standards[1]

Criteria Pollutant	Average Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None[b]	None[b]
	8–hour	0.070 ppm	0.070 ppm	0.070 ppm
Particulate Matter (PM10)	24-hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
	Annual mean	20 μg/m^3	None	None
Fine Particulate Matter (PM2.5)	24-hour	None	35 μg/m^3	35 μg/m^3
	Annual mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
Carbon Monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
	8-hour (Lake Tahoe)	6 ppm	None	None
Nitrogen Dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur Dioxide[c]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.14 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day Average	1.5 μg/m^3	None	None
	Calendar quarter	None	1.5 μg/m^3	1.5 μg/m^3
	3-month average	None	0.15 μg/m^3	0.15 μg/m^3
Sulfates	24-hour	25 μg/m^3	None	None
Visibility Reducing Particles	8-hour	--[d]	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None

Notes:
PM10 = particulate matter less than or equal to 10 microns in diameter.
PM2.5 = particulate matter less than or equal to 2.5 microns in diameter.
μg/m^3 = micrograms per cubic meter.
ppm = parts per million.

a. National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

b. The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for State Implementation Plans.

c. The annual and 24-hour NAAQS for sulfur dioxide only apply for 1 year after designation of the new 1-hour standard to those areas that were previously nonattainment for 24-hour and annual NAAQS.

d. CAAQS for visibility reducing particles is defined by an extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.

[1] California Air Resources Board. 2015b. *Ambient Air Quality Standards.* Last revised: October 1, 2015. Available: <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. Accessed: October 14, 2015.

State

California Clean Air Act and California Ambient Air Quality Standards

In 1988, the state legislature adopted the California CAA, which established a statewide air pollution control program. The California CAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the federal CAA, the California CAA does not set precise attainment deadlines. Instead, the California CAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than the NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility reducing particles, and vinyl chloride. The CAAQS and NAAQS are listed together in Table 3.4-1.

The California Air Resources Board (ARB) and local air districts bear responsibility for achieving California's air quality standards, which are to be achieved through district-level air quality management plans that would be incorporated into the SIP. In California, the federal Environmental Protection Agency (EPA) has delegated authority to prepare SIPs to ARB, which, in turn, has delegated that authority to individual air districts. ARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The California CAA substantially adds to the authority and responsibilities of air districts. The California CAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The California CAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The California CAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures (TCMs).

State Tailpipe Emission Standards

ARB established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and harbor craft. New construction equipment used for the Project, including heavy-duty trucks and off-road construction equipment, would be required to comply with the standards.

Toxic Air Containment Regulation

California regulates toxic air contaminants (TACs) primarily through the Toxic Air Contaminant Identification and Control Act (Tanner Act) and the Air Toxics "Hot Spots" Information and Assessment Act of 1987 ("Hot Spots" Act). In the early 1980s, ARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California's program to reduce exposure to air toxics. The "Hot Spots" Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

In August 1998, ARB identified diesel particulate matter (DPM) from diesel-fueled engines as TACs. In September 2000, ARB approved a comprehensive Diesel Risk Reduction Plan to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce DPM (respirable particulate matter) emissions and the associated health risk by 75 percent in 2010 and by 85 percent by 2020. The plan identifies 14 measures that ARB will implement over the next several years.

Local

Bay Area Air Quality Management District/2010 Clean Air Plan

The Bay Area Air Quality Management District (BAAQMD) has local air quality jurisdiction over projects in San Mateo County. Responsibilities of BAAQMD include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by the California Environmental Quality Act (CEQA). The air quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

BAAQMD has adopted advisory emission thresholds to assist CEQA lead agencies in determining the level of significance of a project's emissions, which are outlined in its *California Environmental Quality Act Air Quality Guidelines* (CEQA Guidelines)[2]. BAAQMD has also adopted air quality plans to improve air quality, protect public health, and protect the climate. The Bay Area 2001 Ozone Attainment Plan was adopted to reduce ozone and achieve the NAAQS ozone standard, and the 2010 Clean Air Plan was adopted to provide an integrated control strategy for ozone, particulate matter (PM), TACs, and greenhouse gas (GHG) emissions. BAAQMD also adopted a redesignation plan for carbon monoxide (CO) in 1994. The redesignation plan includes strategies to ensure the continuing attainment of the NAAQS for CO in the San Francisco Bay Area Air Basin (SFBAAB).

The Project may be subject to the following district rules. This list of rules may not be all-encompassing as additional BAAQMD rules may apply to the Project as specific components are identified.

- **Regulation 2, Rule 2 (New Source Review).** This regulation contains requirements for Best Available Control Technology and emission offsets.
- **Regulation 2, Rule 5 (New Source Review of Toxic Air Contaminates).** This regulation outlines guidance for evaluating TAC emissions and their potential health risks.
- **Regulation 6, Rule 1 (Particulate Matter).** This regulation restricts emissions of PM darker than No. 1 on the Ringlemann Chart to less than three minutes in any one hour.
- **Regulation 7 (Odorous Substances).** This regulation establishes general odor limitations on odorous substances and specific emission limitations on certain odorous compounds.
- **Regulation 8, Rule 3 (Architectural Coatings).** This regulation limits the quantity of volatile organic compounds (VOCs) in architectural coatings.
- **Regulation 9, Rule 6 (Nitrogen oxides emission from natural gas-fired boilers and water heaters).** This regulation limits emissions of nitrogen oxides (NO_X) generated by natural gas-fired boilers.

[2] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines.* May. San Francisco, CA. The BAAQMD CEQA Guidelines were challenged in court by the California Building Industry Association. Although a lower court ruling put the adoption of the guidelines on hold, with a ruling that BAAQMD had to complete a CEQA analysis to adopt the guidelines, the lower court ruling was overturned by the appellate court. The guidelines are currently under consideration by the California Supreme Court. BAAQMD at present has no recommendation to local lead agencies on the use of the 2011 guidelines. However, there is no court order constraining their use, and they are frequently employed by lead agencies when conducting CEQA reviews because the evidence in the BAAQMD 2011 guidelines still provides a substantial evidence-based approach to air quality impact analyses and BAAQMD-recommended significance thresholds.

- **Regulation 9, Rule 8 (Stationary Internal Combustion Engines).** This regulation limits emissions of NO_X and CO from stationary internal combustion engines of more than 50 horsepower.
- **Regulation 11, Rule 2 (Asbestos Demolition, Renovation and Manufacturing).** This regulation controls emissions of asbestos to the atmosphere during demolition and renovation activities.

City of Menlo Park

Local jurisdictions, such as the City of Menlo Park (City), have the authority to address air pollution issues through their land use decision-making processes. Specifically, the City is responsible for assessing the potential for and mitigating air quality problems that result from its land use decisions. The City is also responsible for the implementation of transportation control measures, as outlined in the Clean Air Plan.

In accordance with CEQA requirements and the CEQA review process, the City assesses the air quality impacts of new development projects, requires mitigation of potentially significant air quality impacts by conditioning discretionary permits, and monitors and enforces the implementation of such mitigation measures. The City uses the BAAQMD CEQA Guidelines as its guidance document for the environmental review of plans and development proposals within its jurisdiction.

City of Menlo Park General Plan. The General Plan guides development and use of land within the city. Several goals and policies would be expected to contribute to improving air quality. However, the following goal and policy from the Open Space and Conservation Element are most relevant to the Project.[3]

> **Goal OSC5:** Ensure Healthy Air Quality and Water Quality. Enhance and preserve air quality in accord with state and regional standards, and encourage the coordination of total water quality management including both supply and wastewater treatment.
>
> *Policy OSC5.1*: Air and Water Quality Standards. Continue to apply standards and policies established by the Bay Area Air Quality Management District (BAAQMD), San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), and City of Menlo Park Climate Action Plan through the California Environmental Quality Act (CEQA) process and other means as applicable.

ConnectMenlo General Plan Update. The City General Plan (Land Use and Circulation Elements) and M-2 Area Zoning Update, also known as ConnectMenlo, is under way. Although not yet adopted, the following draft goal and policy in ConnectMenlo pertain to the Project and are identified for informational purposes.

> **Goal CIRC-3 Sustainable Transportation:** Increase mobility options to reduce traffic congestion, greenhouse gas emissions, and commute travel time**.**
>
> *Policy CIRC-4.2:* Local Air Pollution. Promote non-motorized transportation to reduce exposure to local air pollution, thereby reducing risks of respiratory diseases, other chronic illnesses, and premature death.

[3] City of Menlo Park. 2013. *Menlo Park General Plan, Open Space/Conservation, Noise and Safety Elements*. Adopted May 21.

Environmental Setting

Climate and Atmospheric Conditions

While the primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted from those sources, meteorological conditions and topography are also important factors. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Unique geographic features throughout the state define 15 air basins with distinctive regional climates.

The Project is within the SFBAAB, an area surrounded by mountains that confine the movement of air and the pollutants it contains. This area includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, the western half of Solano, and the southern half of Sonoma Counties. The regional climate within the SFBAAB is considered semi-arid and is characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. A wide range of meteorology and emissions sources—such as dense population centers, heavy vehicular traffic, and industrial activity—primarily influence the air quality within the SFBAAB.

Air pollutant emissions within the SFBAAB are generated from stationary, area-wide, mobile, and natural sources. Stationary sources can be divided into two major subcategories: point and area sources. *Point sources* occur at an identified location and are usually associated with manufacturing and industry. Examples are boilers and combustion equipment that produce electricity or generate heat. *Area sources* consist of many smaller point sources that are widely distributed. Examples of area sources include residential and commercial water heaters, painting operations, portable generators, lawn mowers, agricultural fields, landfills, and consumer products, such as barbeque lighter fluid and hair spray. Construction activities that create fugitive dust, through activities such as excavation and grading, also contribute to area source emissions. Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions, and are classified as either on-road or off-road. On-road sources may be legally operated on roadways and highways. Off-road sources include aircraft, ships, trains, and self-propelled construction equipment. Air pollutants can also be generated by the natural environment, such as when fine dust particles are pulled off the ground surface and suspended in the air during high winds.

Criteria Air Pollutants of Concern

The federal and state governments have established NAAQS and CAAQS, respectively, for six criteria pollutants: ozone (O_3), CO, lead (Pb), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and PM, which consists of PM 10 microns in diameter or less (PM10) and PM 2.5 microns in diameter or less (PM2.5).

Ozone and NO_2 are considered regional pollutants because they (or their precursors) affect air quality on a regional scale; NO_2 reacts photochemically with reactive organic gases (ROGs) to form ozone, and this reaction occurs at some distance downwind of the source of pollutants. Pollutants such as CO, SO_2, and Pb are considered to be local pollutants that tend to accumulate in the air locally. Particulate matter is considered to be a local as well as a regional pollutant.

The primary pollutants of concern in the study area are ozone (including NO_X), CO, and PM. Principal characteristics surrounding these pollutants are discussed below. TACs are also discussed, although no air quality standards exist for these pollutants.

Ozone

Ozone is a respiratory irritant that can cause severe ear, nose, and throat irritation and increases susceptibility to respiratory infections. It is also an oxidant that causes extensive damage to plants through leaf discoloration and cell damage. It can cause substantial damage to other materials as well, such as synthetic rubber and textiles.

Ozone is not emitted directly into the air but is formed by a photochemical reaction in the atmosphere. Ozone precursors, ROG and NO_X, react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem. The ozone precursors, ROG and NO_X, are mainly emitted by mobile sources and by stationary combustion equipment.

Hydrocarbons are organic gases that are made up of hydrogen and carbon atoms. There are several subsets of organic gases, including ROGs and VOCs. ROGs are defined by state rules and regulations; VOCs are defined by federal rules and regulations. For the purposes of this assessment, hydrocarbons are classified and referred to as ROGs. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels, or as a product of chemical processes. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants; other common sources are petroleum fuels, solvents, dry-cleaning solutions, and paint (through evaporation).

The health effects of hydrocarbons result from the formation of ozone. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen though displacement. Carcinogenic forms of hydrocarbons are considered TACs. There are no separate health standards for ROGs, although some are also toxic; an example is benzene, which is both an ROG and a carcinogen.

Nitrogen Oxides

Nitrogen oxides are a family of highly reactive gases that are a primary precursor to the formation of ground-level ozone, and react in the atmosphere to form acid rain. NO_2, often used interchangeably with NO_X, is a brownish, highly reactive gas that is present in all urban environments. The major human sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines.

Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2.[4] The combined emissions of NO and NO_2 are referred to as NO_X and reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with ozone, the NO_2 concentration in a particular geographical area may not be representative of local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects primarily depends on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, such as coughing, difficulty breathing, vomiting, headache, and eye irritation during or shortly after exposure. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing

[4] U.S. Environmental Protection Agency. 2016. *Nitrogen Dioxide (NO_2).* Last Updated: February 22, 2016. Available: <https://www3.epa.gov/airtrends/aqtrnd95/no2.html >. Accessed: March 25, 2016.

abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe symptomatic NO_2 intoxication after acute exposure has been linked to prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung function.[5]

Carbon Monoxide

CO has little effect on plants and materials, but it can have significant effects on human health. CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Effects range from slight headaches to nausea to death.

Motor vehicles are the primary source of CO emissions in most areas. In the Project area, high CO levels are of greatest concern during the winter, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. These conditions trap pollutants near the ground, reducing the dispersion of vehicle emissions. Moreover, motor vehicles exhibit increased CO emission rates at low air temperatures. Dramatic reductions in CO levels across California, including a 50 percent decrease in statewide peak CO levels between 1980 and 2004, have been witnessed during the past several decades. These reductions are primarily a result of ARB requirements for cleaner vehicles, equipment, and fuels.[6]

Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. Particulate matter less than 10 microns in diameter, about $1/7^{th}$ the thickness of a human hair, is referred to as PM10. Particulate matter that is 2.5 microns or less in diameter, roughly $1/28^{th}$ the diameter of a human hair, is referred to as PM2.5. Major sources of PM10 include motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. PM2.5 results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, PM10 and PM2.5 can be formed in the atmosphere from gases such as SO_2, NO_X, and VOCs.

PM10 and PM2.5 pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. PM10 and PM2.5 can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as lead, sulfates, and nitrates, can cause lung damage directly. These substances can be absorbed into the blood stream and cause damage elsewhere in the body; they can also transport absorbed gases such as chlorides or ammonium into the lungs and cause injury. Whereas particles 2.5 to 10 microns in diameter tend to collect in the upper portion of the respiratory system, particles 2.5 microns or less are so tiny that they can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, and contribute to haze and reduce regional visibility.

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[5] U.S. Environmental Protection Agency. 2015a. *Criteria Pollutant Information.* Last Revised: September 10, 2015. Available: <http://www3.epa.gov/airquality/nitrogenoxides/health.html>. Accessed: October 16, 2015.

[6] California Air Resources Board. 2004. *2004 Revision to the California State Implementation Plan for Carbon Monoxide.* July. Available: <http://www.arb.ca.gov/planning/sip/co/final_2004_co_plan_update.pdf>. Accessed: September 18, 2015.

Toxic Air Contaminants

TACs are pollutants that may result in an increase in mortality or serious illness, or that may pose a present or potential hazard to human health. Health effects of TACs include cancer, birth defects, neurological damage, damage to the body's natural defense system, and diseases that lead to death. In 1998, following a 10-year scientific assessment process, the ARB identified PM from diesel-fueled engines (commonly called DPM) as a TAC. Compared to other air toxics ARB has identified, DPM emissions are estimated to be responsible for about 70 percent of the total ambient air toxics risk.[7]

Existing Air Quality Conditions

Existing air quality conditions in the study area can be characterized by monitoring data collected in the region. The air quality monitoring station closest to the Project site is the Redwood City station at 897 Barron Avenue, which is located approximately 2 miles to the west of the Project site. The Redwood City station does not have data available for PM10, however. The nearest station to the Project site with PM10 data available is the Cupertino Voss Avenue Station. Recent air quality monitoring results from the Redwood City and Cupertino Stations (PM10 only) are summarized in Table 3.4-2. The data represent air quality monitoring for the last three years for which a complete dataset is available (2013–2015). As indicated in Table 3.4-2, the Redwood City monitoring station has experienced violations of the state 8-hour ozone and federal NO_2 standards during this time period.

Table 3.4-2. Ambient Criteria Air Pollutant Monitoring Data (2013–2015)[8,9]

Pollutant Standards	2013	2014	2015
Ozone (O_3) (Redwood City Station)			
Maximum 1-hour concentration (ppm)	0.083	0.086	0.086
Maximum 8-hour concentration (ppm)	0.076	0.066	0.071
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	0	0	0
CAAQS 8-hour (>0.070 ppm)	1	0	1
NAAQS 8-hour (>0.075 ppm)	0	0	0
Carbon Monoxide (CO) (Redwood City Station)			
Maximum 8-hour concentration (ppm)	--	--	--
Maximum 1-hour concentration (ppm)	1.6	1.6	1.6
Number of days standard exceeded[a]			
NAAQS 8-hour (≥9 ppm)	--	--	--
CAAQS 8-hour (≥9.0 ppm)	--	--	--
NAAQS 1-hour (≥35 ppm)	0	0	0
CAAQS 1-hour (≥20 ppm)	0	0	0

[7] California Air Resources Board. 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. Sacramento, CA. Prepared by Stationary Source Division and Mobile Source Control Division. Available: <http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf>. Accessed: September 18, 2015.

[8] California Air Resources Board. 2015a. *iADAM: Air Quality Data Statistics: Top 4 Summary*. Available: <http://www.arb.ca.gov/adam/topfour/topfour1.php>. Accessed: October 20, 2015.

[9] U.S. Environmental Protection Agency. 2015b. *Monitor Values Report*. Available: <http://www.epa.gov/airdata/ad_rep_mon.html>. Accessed: October 20, 2015.

Pollutant Standards	2013	2014	2015
Nitrogen Dioxide (NO_2) (Redwood City Station)			
State maximum 1-hour concentration (ppm)	53	55	47
State second-highest 1-hour concentration (ppm)	51	54	46
Annual average concentration (ppm)	12	11	10
Number of days standard exceeded			
CAAQS 1-hour (0.18 ppm)	0	0	0
Particulate Matter (PM10) (Cupertino Station)			
National[b] maximum 24-hour concentration (μg/m³)	31.0	--	--
National[b] second-highest 24-hour concentration (μg/m³)	27.8	--	--
State[c] maximum 24-hour concentration (μg/m³)	33.5	--	--
State[c] second-highest 24-hour concentration (μg/m³)	29.5	--	--
National annual average concentration (μg/m³)	14.0	--	--
State annual average concentration (μg/m³)[d]	14.5	--	--
Number of days standard exceeded[e]			
NAAQS 24-hour (>150 μg/m³)	0	0	0
CAAQS 24-hour (>50 μg/m³)	0	0	0
Particulate Matter (PM2.5) (Redwood City Station)			
National[b] maximum 24-hour concentration (μg/m³)	39.0	35.0	34.6
National[b] second-highest 24-hour concentration (μg/m³)	38.5	32.4	26.0
State[c] maximum 24-hour concentration (μg/m³)	39.0	35.0	34.6
State[c] second-highest 24-hour concentration (μg/m³)	38.5	32.4	26.0
National annual average concentration (μg/m³)	10.7	7.2	--
State annual average concentration (μg/m³)[d]	--	7.2	--
Number of days standard exceeded[e]			
NAAQS 24-hour (>35 μg/m³)	3	0	0

Notes:

ppm = parts per million
NAAQS = National Ambient Air Quality Standards
CAAQS = California Ambient Air Quality Standards
μg/m³ = micrograms per cubic meter
-- = data not available

[a.] An exceedance is not necessarily a violation.

[b.] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[c.] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California approved samplers.

[d.] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[e.] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

Attainment Status

Local monitoring data (Table 3.4-2) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are defined as follows:

- **Nonattainment**—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- **Maintenance**—assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- **Attainmen**t—assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- **Unclassified**—assigned to areas were data are insufficient to determine whether a pollutant is violating the standard in question.

Table 3.4-3 summarizes the attainment status of San Mateo County with regard to the NAAQS and CAAQS.

Table 3.4-3. Federal and State Attainment Status for San Mateo County[10,11]

Criteria Pollutant	Federal Designation	State Designation
O_3 (8-hour)	Marginal Nonattainment	Nonattainment
CO	Maintenance	Attainment
PM10	Attainment	Nonattainment
PM2.5	Nonattainment	Nonattainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(No Federal Standard)	Attainment
Hydrogen Sulfide	(No Federal Standard)	Unclassified
Visibility Reducing Particles	(No Federal Standard)	Unclassified

Notes:
CO = carbon monoxide
PM10 = particulate matter less than or equal to 10 microns
PM2.5 = particulate matter less than or equal to 2.5 microns
NO_2 = nitrogen dioxide
SO_2 = sulfur dioxide

[10] California Air Resources Board. 2014. *Area Designations Maps.* Last Reviewed: August 22, 2014. Available: <http://www.arb.ca.gov/desig/adm/adm.htm#state >. Accessed: October 20, 2015.

[11] U.S. Environmental Protection Agency. 2015c. *The Green Book Nonattainment Areas for Criteria Pollutants*. Last Updated: October 14, 2015. Available: <http://www3.epa.gov/airquality/greenbook/>. Accessed: October 20, 2015.

Sensitive Receptors

The NAAQS and CAAQS apply at publicly accessible areas, regardless of whether those areas are populated. BAAQMD generally defines a sensitive receptor as a facility or land use that houses or attracts members of the population who are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of sensitive receptors include residences, hospitals, schools, daycares, senior facilities, parks, playgrounds, and community centers. Sensitive Receptors located within 1,000 feet of the Project are provided in Table 3.4-4.

Table 3.4-4. Sensitive Receptors within 1,000 Feet of the Project Area

Receptor	Distance of Nearest Receptor to Project (Nearest Project Parcel)
Residences	100 feet[a]
Hamilton Avenue Playground	150 feet south
Beechwood School	200 feet south
Bay Trail	200 feet north
Onetta Harris Community Center, Menlo Park Senior Center and Belle Haven Youth Center	300 feet south
Kelly Park	630 feet southwest
Boys & Girls Club	800 feet south

Note:

[a] There are many residences within 1,000 feet of the Project site on the south side but none near any other side. The closest residences are south of future Building 21, where the distance between the future green space area and the homes on Sandlewood Street is approximately 100 feet. Residences south of the western half of the Project site (containing future Building 22 and existing Building 23) are approximately 275 feet away.

Environmental Impacts

This section describes the impact analysis relating to air quality for the Project. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Conflict with or obstruct implementation of the applicable air quality plan. For the purposes of this analysis, "conflict with or obstruct implementation" is defined as circumstances in which the Project would result in:

- Population and/or employment growth that exceeds estimates used to develop applicable air quality plans, which is evaluated through consistency with the City's General Plan (i.e., projects that propose development that is consistent with the growth anticipated by the relevant land use plans or propose development that is less dense than anticipated within a relevant land use plan would be consistent with the current BAAQMD air quality plans).
- Growth that exceeds the assumptions utilized by the City of Menlo Park and Association of Bay Area Governments (ABAG).

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation. For the purposes of this analysis, "violate any air quality standard or substantially contribute to an existing or projected air quality violation" is defined as circumstances in which construction or operational emissions exceed the pertinent BAAQMD thresholds, as described below under *Local Air District Thresholds*.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is a nonattainment area for an applicable federal or state ambient air quality standard. For the purposes of this analysis, a "cumulatively considerable net increase" is defined as circumstances in which total direct emissions exceed BAAQMD thresholds identified in Table 3.4-5. The emissions thresholds presented in Table 3.4-5 represent the average daily emissions that a project may generate before contributing to a cumulative impact on regional air quality. Therefore, exceedances of the project-level thresholds, as identified in Table 3.4-5, would be cumulatively considerable.
- Expose sensitive receptors to substantial pollutant concentrations. For the purpose of this analysis, residences, hospitals, schools, daycares, senior facilities, parks, playgrounds, and community centers are considered sensitive receptor locations. A "substantial pollutant concentration" is defined as levels in excess of applicable BAAQMD thresholds, as described below under *Local Air District Thresholds*.
- Create objectionable odors affecting a substantial number of people. For the purpose of this analysis, an odor-producing facility, as defined by BAAQMD,[12] creates an "objectionable odor" if it receives five complaints per year averaged over 3 years.

According to the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make significance determinations for potential impacts on environmental resources. As discussed above, BAAQMD is responsible for ensuring that state and federal ambient air quality standards are not violated within the SFBAAB. Analysis requirements for construction- and operational-related pollutant emissions are contained in BAAQMD's CEQA Guidelines. These guidelines also contain thresholds of significance for ozone, CO, PM2.5, PM10, TACs, and odors; these thresholds are presented in Table 3.4-5.

[12] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines*. May. San Francisco, CA.

Table 3.4-5. BAAQMD Project-Level Criteria Pollutant Emissions Thresholds[13]

Analysis	Threshold	
Regional Criteria Pollutants (Construction)	ROG:	54 pounds/day
	NO_X:	54 pounds/day
	PM10:	82 pounds/day (exhaust only)
	PM2.5:	54 pounds/day (exhaust only)
Regional Criteria Pollutants (Operations)	ROG:	Same as construction
	NO_X:	Same as construction
	PM10:	82 pounds/day (total)
	PM2.5:	54 pounds/day (total)
Localized Carbon Monoxide	Violation of CAAQS (per screening criteria)	
Localized Particulate Matter	Failure to implement emissions control practices PM2.5 increase of greater than 0.3 µg/m^3 (Project) PM2.5 increase of greater than 0.8 µg/m^3 (cumulative)	
Localized Diesel Particulate Matter	Increased cancer risk of 10 in 1 million (Project) Increased HI greater than 1.0 (Project) Increased cancer risk of 100 in 1 million (cumulative) Increased HI greater than 10.0 (cumulative)	
Asbestos	Failure to comply with Regulation 11, Rule 2	
Odors	Five complaints per year averaged over three years during Project operation	

Notes:
ROG = reactive organic gas
NO_X = nitrogen oxides
PM10 = particulate matter less than or equal to 10 microns in diameter
PM2.5 = particulate matter less than or equal to 2.5 microns in diameter
CAAQS = California ambient air quality standards
µg/m^3 = micrograms per cubic meter
HI = hazard index

[13] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines*. May. San Francisco, CA.

In March 2012, the Alameda County Superior Court ruled that BAAQMD needed to comply with CEQA prior to adopting their 2010 CEQA Guidelines, which included significance thresholds for criteria air pollutants and GHGs. The Superior Court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was a project under CEQA. The court ordered a writ of mandate ordering BAAQMD to set aside the thresholds and cease dissemination of them until BAAQMD complied with CEQA. In May 2012, BAAQMD filed an appeal with the Court of Appeal, First Appellate District; and the plaintiff filed a cross-appeal shortly thereafter. In August 2013, the Court of Appeal reversed the trial court's decision and ruled that adoption of guidelines and thresholds is not considered a project subject to CEQA review, and adoption of the significance thresholds was not arbitrary and capricious. The Court of Appeal's decision was subsequently appealed to the California Supreme Court, which granted limited review to the issue of whether CEQA requires "an analysis of how existing environmental conditions will impact future residents or users (receptors) of a proposed project." In December 2015, the Supreme Court ruled in favor of the plaintiff, finding that "CEQA generally does not require an analysis of how existing environmental conditions will impact a project's future users or residents." The Supreme Court identified several exceptions in which CEQA could apply to impacts of the environment on the project, all of which are statutory provisions in CEQA that specifically require consideration of impacts of the environment, such as consideration of projects near airports, school construction projects, and statutory exemptions for housing and transit priority projects, or if a project would generate emissions that exacerbates an existing environmental hazard.

Although BAAQMD does not recommend its significance thresholds for use by local agencies, BAAQMD's proposed thresholds are supported by substantial evidence and are well grounded in air quality regulations, scientific evidence, and scientific reasoning concerning air quality and GHG emissions. Use of these thresholds is appropriate to determine significance in the environmental review of this Project and allows a rigorous standardized approach of determining whether the Project would cause a significant air quality impact. BAAQMD's Justification Report, found in Appendix D of BAAQMD's May 2011 CEQA Guidelines, explains the agency's reasoning and provides substantial evidence for developing and adopting their thresholds.[14] Below is a summary of the basis upon which BAAQMD's thresholds were developed.

Local Air District Thresholds

The following section summarizes BAAQMD's thresholds and presents substantial evidence[15] regarding the basis upon which they were developed. It also describes how the thresholds are used to determine whether Project construction and operational emissions would result in either of the following.

- Interfere or impede with attainment of state or federal ambient air quality standards (CAAQS and NAAQS, respectively).
- Cause increased risk to human health.

[14] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines*. May. San Francisco, CA.

[15] As noted above, BAAQMD has temporarily withdrawn its recommended guidelines published in 2011 due to a pending lawsuit that is on appeal at the California Supreme Court, but the BAAQMD 2011 CEQA Guidelines still provide a substantial evidence-based approach to air quality impact analysis and the BAAQMD-recommended significant thresholds that are appropriate for use in this EIR.

Regional Thresholds for Air Basin Attainment of State and Federal Ambient Air Quality Standards

BAAQMD adopted thresholds for regional air pollutants (see Table 3.4-5) (as discussed above, ROG and NO_X are regional pollutants, whereas PM is both a regional and local pollutant) to assist lead agencies in determining the significance of environmental effects with regards to local attainment of state and federal ambient air quality standards. The thresholds are based on emissions levels identified under the "New Source Review" (NSR) program, which is a permitting program established by Congress as part of the CAA Amendments of 1990 to ensure that air quality is not significantly degraded by new sources of emissions. The NSR program requires that stationary sources receive permits before construction begins and/or the use of equipment. By permitting large stationary sources, the NSR program assures that new emissions would not slow regional progress toward attaining the NAAQS. BAAQMD has concluded that the stationary pollutants described under the NSR program are equally significant to those pollutants generated with land use projects. BAAQMD's regional thresholds identified in Table 3.4-5 were set as the total emission thresholds associated within the NSR program to help attain the NAAQS.[16]

Health-Based Thresholds for Project-Generated Pollutants of Human Health Concern

As discussed above, all criteria pollutants are associated with some form of health risk (e.g., asthma, asphyxiation). Adverse health effects associated with criteria pollutant emissions are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, as well as the number and character of exposed individuals [e.g., age, gender]). Moreover, ozone precursors (ROG and NO_X) affect air quality on a regional scale. Health effects related to ozone are therefore the product of emissions generated by numerous sources throughout a region. Existing models have limited sensitivity to small changes in criteria pollutant concentrations, and, as such, translating project-generated criteria pollutants to specific health effects would not produce meaningful results. In other words, minor increases in regional air pollution from project-generated ROG and NO_X would have nominal or negligible impacts on human health.[17] As such, an analysis of impacts on human health associated with project-generated regional emissions is not included in the project-level analysis.[18]

Increased emissions of ozone precursors (ROG and NO_X) generated by the Project could increase photochemical reactions and the formation of tropospheric ozone, which at certain concentrations, could lead to respiratory symptoms (e.g., coughing), decreased lung function, and inflammation of airways. Although these health effects are associated with ozone, the impacts are a result of cumulative and regional ROG and NO_X emissions, and the incremental contribution of the Project to specific health outcomes from criteria pollutant emissions would be limited and cannot be solely traced to the Project (see *Cumulative Impacts* below for a discussion of regional cumulative impacts).

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[16] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines.* May. San Francisco, CA. Available: <http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx>. Accessed: September 18, 2015.

[17] As an example, BAAQMD's Multi-Pollutant Evaluation Method (MPEM) requires a 3 to 5 percent increase in regional ozone precursors to produce a material change in modeled human health impacts. Based on 2008 ROG and NO_X emissions in the Bay Area, a 3 to 5 percent increases equates to over 20,000 pounds per day of ROG and NO_X.

[18] Human health impacts due to project-related localized toxic air contaminants (TACS) are analyzed through health risk assessments (HRAs) discussed later in this section.

Because localized pollutants generated by a project can directly affect adjacent sensitive receptors, the analysis of project-related impacts on human health focuses only on those localized pollutants with the greatest potential to result in a significant, material impact on human health. This is consistent with the current state-of-practice and published guidance by BAAQMD,[19] the California Air Pollution Control Officers Association,[20] Office of Environmental Health Hazard Assessment,[21] and ARB.[22] [7] These pollutants are (1) locally concentrated CO and PM2.5, (2) DPM,[23] and (3) asbestos.

Localized Carbon Monoxide Concentrations

Heavy traffic congestion can contribute to high levels of CO, and individuals exposed to such hot spots may have a greater likelihood of developing adverse health effects. BAAQMD has adopted screening criteria that provide a conservative indication of whether project-generated traffic would cause a potential CO hot spot. If the screening criteria are not met, a quantitative analysis through site-specific dispersion modeling of project-related CO concentrations would not be necessary, and the project would not cause localized violations of CO CAAQS. BAAQMD's CO screening criteria are summarized below.

1. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
2. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).
3. The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.

Localized Particulate Matter Concentrations

BAAQMD adopted an incremental PM2.5 concentration-based significance threshold, with "substantial" contribution at the project level defined as total (exhaust and fugitive) annual average PM2.5 concentrations exceeding 0.3 microgram per cubic meter ($\mu g/m^3$). Additionally, BAAQMD considers projects to have a cumulatively considerable PM2.5 impact if concentrations from all local sources,

[19] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines*. May. San Francisco, CA.

[20] California Air Pollution Control Officers Association. 2009. *Health Risk Assessments for Proposed Land Use Projects.* CAPCOA Guidance Document. Available: < http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf >. Accessed: October 22, 2015.

[21] Office of Environmental Health Hazard Assessment. 2015. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments.* February. Available: <http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf >. Accessed: October 22, 2015.

[22] California Air Resources Board. 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. Sacramento, CA. Prepared by Stationary Source Division and Mobile Source Control Division. Available: <http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf>. Accessed: September 18, 2015.

[23] DPM is the primary TAC of concern for mobile sources—of all controlled TACs, emissions of DPM are estimated to be responsible for about 70 percent of the total ambient TAC risk. Given the risks associated with DPM, tools and factors for evaluating human health impacts from project-generated DPM have been developed and are readily available. Conversely, tools and techniques for assessing project-specific health outcomes as a result of exposure to other TAC (e.g., benzene) remain limited. These limitations impede the ability to evaluate and precisely quantify potential public health risks posed by TAC exposure.

including project-related sources, exceed 0.8 µg/m^3. BAAQMD has not established PM10 thresholds of significance. BAAQMD's PM2.5 thresholds apply to both new receptors and new sources. However, BAAQMD considers fugitive PM10 from earthmoving activities to be less than significant with application of BAAQMD's Basic and, if warranted, Additional Construction Mitigation Measures.

Localized Toxic Air Contaminant Concentrations

TACs are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A wide range of sources, from industrial plants to motor vehicles, emits TACs, either directly or through reactions among the different pollutants in the atmosphere. The health effects associated with TACs are quite diverse and generally assessed locally rather than regionally. TACs can cause long-term health effects, such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage, or short-term acute affects, such as eye watering, respiratory irritation (a cough), running nose, throat pain, or headaches. For evaluation purposes, TACs are separated into carcinogen and non-carcinogen categories, based on the nature of the physiological effects associated with exposure to the pollutant.

DPM is a form of localized PM (see above) that is generated by diesel equipment and vehicle exhaust. DPM has been identified as a TAC and is particularly concerning because long-term exposure can lead to cancer, birth defects, and damage to the brain and nervous system.

Other potential TACs that may be of concern for the Project include vehicle emissions–related TACs, such as acetaldehyde, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, and naphthalene.

BAAQMD has adopted incremental cancer and hazard thresholds to evaluate receptor exposure to TAC emissions. The "substantial" TAC threshold defined by BAAQMD is an excess cancer risk level of more than 10 in one million, or a non-cancer (i.e., chronic or acute) hazard index (HI) greater than 1.0. BAAQMD also considers projects to have a cumulatively considerable TAC impact if they result in excess cancer risk levels of more than 100 in 1 million or HI greater than 10.0.

Asbestos

BAAQMD considers a project to have a significant impact if it does not comply with the applicable regulatory requirements outlined in Regulation 11, Rule 2.

Odors

The odor threshold as shown in Table 3.4-5 is consistent with BAAQMD Regulation 7 for Odorous Substances and reflects the most stringent standards derived from the Air District rule.

Methods for Analysis

Construction

Mass Emissions

Construction of the Project would generate emissions of ROG, NO_X, CO, PM10, and PM2.5 that would result in short-term impacts on ambient air quality in the study area. Combustion exhaust, fugitive dust (PM10 and PM2.5), and fugitive off-gassing were estimated using the California Emissions Estimator Model (CalEEMod), version 2013.2.2, and construction activity and scheduling information, including phasing information, provided by the Project Sponsor. Equipment inventory data, including equipment type, horsepower, and fuel type were provided by the Project Sponsor. Other construction information,

including the amount of soil imported and exported, the amount of demolition material produced, the number of and distance traveled by haul trucks, and the amount of water used during construction, was also provided by the Project Sponsor. Equipment data not provided by the Project Sponsor, such as load factors, were generated by model default values.

Construction would occur in discrete, partially overlapping phases to construct each of the three future buildings on the Project site. Construction of each of the building areas will involve three to four sub-phases of construction. These sub-phases are *demolition* (except at future Building 21), *foundations*, *core and shell,* and *tenant improvements.* Construction is projected to begin in 2016 and end in 2020. For a full list of the construction details and assumptions provided by the Project Sponsor, please refer to Appendix 3.4.

Demolition associated with existing Buildings 307–309, which is required to accommodate the future Building 21, is a separate project and is thus not included in the analysis of Project emissions. However, emissions from these activities have been quantified in the analysis of cumulative impacts. Pollutant estimates were based on a combination of Project Sponsor input and model defaults, as described below.

- Emissions from on-road employee commute vehicles were calculated separately, independent of CalEEMod using methodology and emission factors consistent with CalEEMod. This is because the Project Sponsor specified that there would be a fixed number of construction employees on the site each day, which cannot be inputted into CalEEMod. Emission factors are based on a weighted average for all vehicle speeds for EMFAC's LDA/LDT1/LDT2 vehicle categories.[24] Emissions factors for methane and nitrous oxide were estimated using the ARB's recommended approach.[25] Construction employee one-way trip lengths are based on the CalEEMod default of 12.4 miles per employee trip for San Mateo County home/work trips (from the CalEEMod User's Guide appendix[26]). It was conservatively assumed that all employees would make two trips per day (one to the site and one home). Criteria pollutant and GHG emissions generated by employee vehicles were estimated by multiplying the number of daily employee vehicle miles by the EMFAC2014 emission factors.
- Emissions from work-truck vehicles used at the construction site were calculated separately, independent of CalEEMod. This is because the work trucks (i.e., consumer-available trucks, used to transport construction personnel on the Project site) are considered on-road vehicles and are not calculated by CalEEMod. Emission factors for the work trucks are based on the 15-mph emission factors for weighted gas and diesel for EMFAC's LHD1[27] category. A 15-mph emission factor was assumed to be a reasonable estimate of the speed traveled by the trucks at the construction site and also a conservative estimate with respect to emissions, given that vehicle emissions-efficiencies are typically lower at low speeds. The Project Sponsor provided the hours per day that the work trucks would be operating at the construction site. The amount of vehicle

[24] LDA = light-duty auto; LDT1 = light-duty trucks with an equivalent test weight equal to or less than 3,750 lbs; LDT2 = light-duty trucks with an equivalent test weight between 3,751 and 5,750 lbs.

[25] California Air Resources Board. 2013. *Mobile Source Emission Inventory – EMFAC 2011 Frequently Asked Questions*. Available: <http://www.arb.ca.gov/msei/emfac2011-faq.htm#emfac2011_web_db_qstn07>. Accessed: January 12, 2016.

[26] California Air Pollution Control Officers Association. No date. *CalEEMod User's Guide – Appendix D.* Available: <http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixd.pdf?sfvrsn=2>. Accessed: January 12, 2016.

[27] LHD1 = light-heavy duty trucks with a gross vehicle weight rating between 8,501–10,000 lbs.

miles traveled by the work trucks was calculated by multiplying the operating hours per day by the assumed speed of 15 mph. The vehicle miles traveled were then multiplied by the 15 mph emission factors to determine emissions.

Emissions from each of the above sources would be generated throughout construction, varying in intensity depending on the nature and scale of construction activity. The average daily emissions were compared to BAAQMD thresholds.[28] The average daily construction emissions were estimated by calculating emissions for each component of construction activity and then summing emissions that would occur within each year in the proposed construction schedule and dividing by the number of days that construction would occur in that year (see Appendix 3.4).

Diesel Particulate Matter

Exposure to construction-related DPM was assessed by predicting the health risks in terms of excess cancer, non-cancer hazard impacts, and elevated PM2.5 concentrations. EPA's AERMOD dispersion model was used to predict hourly PM2.5 and exhaust DPM concentrations at sensitive land uses; DPM is taken as PM2.5 exhaust from diesel equipment only. Both are based on annual PM2.5 mass emissions and the construction schedule Estimates of project-level cancer risk, non-cancer HI, and annual PM2.5 concentrations were based on annual concentrations from AERMOD, anticipated construction durations, and accepted Office of Environmental Health Hazard Assessment (OEHHA)[29] and BAAQMD[30] default values. The risk calculations incorporate OEHHA's recent guidance update, which includes age-specific factors to take into account the increased sensitivity to carcinogens during early-in-life exposure.

Consistent with BAAQMD guidance, cumulative health risks were also analyzed by adding project-level health risk contributions to ambient conditions. Background stationary, highway, and railway sources within 1,000 feet of the Project site were identified using Google Earth map files provided by BAAQMD.[31] Google Earth map files include estimated risk and hazard impacts at nearby receptors from these sources. Risk and hazard impacts from generators were adjusted using BAAQMD's Diesel IC Engine Multiplier Tool.

Operation

Mass Emissions

Operation of the Project would generate emissions of ROG, NO_X, CO, PM10, and PM2.5 that could result in long-term impacts on ambient air quality. Three types of air pollutant sources are expected during operation of the Project: *area*, *energy*, and *mobile*. Area sources include landscaping activities, consumer products (e.g., cleaning products), and periodic paint emissions from facility upkeep. Energy sources include natural gas combustion for space heating and cooking. Mobile sources include vehicle trips from employees and visitors to the Campus.

[28] BAAQMD does not have a threshold for fugitive dust. Instead, the threshold consists of compliance with dust control best management practices.

[29] Office of Environmental Health Hazard Assessment. 2015. *Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments*. February.

[30] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines*. May. San Francisco, CA.

[31] Bay Area Air Quality Management District. 2014. *Tools & Methodology*. Last Revised: January 3, 2014. Available: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools. Accessed: February 8, 2016.

Area, energy, and mobile source emissions associated with the Project baseline (i.e., operation of the TE Connectivity Campus) would be replaced with operational emissions associated with the Project. The difference in operational emissions between the Project and the previous uses associated with the TE Connectivity Campus represents the net impact of the Project analyzed in this analysis.

Area source and energy emissions associated with the TE Connectivity Campus were estimated using CalEEMod to establish the Project baseline. Area source and energy emissions from Building 21, Building 22, and the hotel were also modeled in CalEEMod to determine Project emissions. The net effect of the Project was determined by subtracting the Project area source and energy emissions from the baseline emissions. Emissions from existing mobile sources were assumed to be zero because the baseline condition at the existing TE Connectivity Campus is assumed to include no active employees, as explained in more detail in Chapter 3, *Environmental Impact Analysis*.

Project mobile-source emissions were calculated independently of CalEEMod, using vehicle miles traveled (VMT) data specific to the Project. Project-generated VMT was derived from a memorandum prepared by Fehr & Peers (included in Appendix 3.4) that summarizes travel characteristics for the Project. The memorandum quantifies the number of VMT per person at the Project site for three groups of people: full-time employees and interns; vendors and contractors; and visitors. These VMT values were multiplied by the number of new employees at non-hotel Project uses (6,400 employees) to determine Project VMT. VMT associated with the hotel use at the Project site was calculated separately using trip rates from the Institute of Transportation Engineer's (ITE's) *Trip General Manual, 9th Edition,*[32] and default trip percentages and lengths from CalEEMod. Employee travel in employer-sponsored shuttles and vanpools is not included in the Fehr & Peers memorandum and was evaluated separately. Existing data for employer-sponsored shuttles and vanpools (i.e., vehicle make and model, vehicle model years, vehicle fuel types, annual VMT) were provided by the Project Sponsor (included in Appendix 3.4). To estimate VMT from employer-sponsored shuttles and vanpools associated with the Project, the existing VMT provided by the Project Sponsor was scaled by 94 percent to account for the anticipated maximum employment growth.[33] Project VMT from all sources was multiplied by the appropriate emissions factors from the EMFAC2014 model to characterize accurately the specific vehicle types that would be associated with the Project. Specific combinations of emissions factors from EMFAC2014 were used for each type of trip. Details on the emissions factors used in the analysis are included in Appendix 3.4.

Toxic Air Contaminants

Because Project operation would not involve an appreciable amount of diesel vehicles, toxic air contaminants associated with Project operation were not assessed.

Carbon Monoxide Hot Spot

The analysis of CO hot spots was conducted using vehicle trip information from the Project's traffic impact assessment (see Section 3.3, *Transportation/Traffic*). Traffic volumes at local intersections were evaluated relative to the BAAQMD screening criteria discussed above.

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[32] Institute of Transportation Engineers. 2012. *Trip Generation Manual, 9th Edition.* Available: <http://www.ite.org/tripgeneration/trippubs.asp>. Accessed: April 21, 2016.

[33] The existing VMT data provided by the Project Sponsor correspond to an employee count of 6,785. It was assumed that the rate of employee use of the shuttles and vanpools would be identical for existing employees and new Project employees; thus, the Project increase of 6,400 employees would result in 94 percent (6,400/6,785 = 94 percent) of the existing shuttle and vanpool VMT.

Impacts and Mitigation Measures

Impact AQ-1: Conflict with Air Quality Plan. The Project would not conflict with or obstruct implementation of the applicable air quality plan. (LTS)

San Mateo County is currently designated a nonattainment area for the federal ozone standard, a maintenance area for the federal CO standard, and nonattainment for state ozone, PM10, and PM2.5 standards (Table 3.4-3). The most recent federal attainment plans are the 2001 Ozone Attainment Plan and the 1994 CO Redesignation Request and Maintenance Plan. The most recent state air quality plan is the 2010 Clean Air Plan, which provides an integrated strategy to control ozone, PM, TACs, and GHG emissions. BAAQMD plans estimate future emissions in the SFBAAB and determine strategies necessary for emissions reductions through regulatory controls. Emissions projections are based on population, vehicle, and land use trends typically developed by BAAQMD, the Metropolitan Transportation Commission (MTC), and Association of Bay Area Governments (ABAG).

A project is deemed inconsistent with air quality plans if it would result in population and/or employment growth that exceeds estimates used to develop applicable air quality plans. Projects that propose development that is consistent with the growth anticipated by the relevant land use plans would be consistent with the current BAAQMD air quality plans. Likewise, projects that propose development that is less dense than anticipated within a general plan (or other governing land use document) would be consistent with the air quality plans because emissions would be less than estimated for the region. If a project proposes development that is greater than anticipated growth projections, the project would be in conflict with BAAQMD air quality plans, and might have a potentially significant impact on air quality because emissions would exceed those estimated for the region. This situation would warrant further analysis to determine if a proposed project and surrounding projects would exceed the growth projections used in BAAQMD air quality plans for a specific subregional area.

As discussed in Section 3.1, *Land Use and Planning*, in Impact LU-1, the Project would not conflict with the existing land use designation and would be consistent with the City's General Plan. Section 3.12, *Population and Housing*, indicates that the Project would add 6,550 employees,[34] which is nearly three times the anticipated employment growth for the City's sphere of influence from 2015 to 2020 and 0.6 percent of the anticipated population growth in the ABAG area for 2040.[35] However, Section 3.12, *Population and Housing*, indicates that although the number of employees generated by the Project would exceed ABAG projections, it would not result in an increase in city population or a demand for housing that would exceed ABAG projections.

The most relevant land use plan for the Project site is the current City of Menlo Park General Plan and related documents. The Project's inclusion of trip-reducing Transportation Demand Management (TDM) features and incentives would be consistent with Goal II-C (promote the use of alternatives to the single occupant automobile) of the Circulation and Transportation Element of the City's General Plan.[36]

[34] Building 21 would have 3,400 employees, Building 22 would have 3,000 employees, and the hotel would have 150 employees.

[35] Assumed growth between 2010 and 2040 in jobs is 1,119,920. Association of Bay Area Governments. 2013. *The Bay Area in 2040.* Available: <http://mtc.ca.gov/sites/default/files/2-The_Bay_Area_In_2040.pdf>. Accessed: January 19, 2016.

[36] City of Menlo Park. 1994. *City of Menlo Park General Plan – Circulation and Transportation Element*. Available: <http://menlopark.org/DocumentCenter/View/233>. Accessed: January 19, 2016.

The Project is consistent with BAAQMD's 2010 CAP strategies, including TCM-C-1 (Voluntary Employer-Based Trip Reduction Programs) and TCM-D-3 (Local Land Use Strategies). TCM-C-1 supports voluntary efforts by Bay Area employers to encourage their employees to use alternative commute modes, such as transit, ridesharing, bicycling, walking, and telecommuting. TCM-D-3 supports and promotes land use patterns, policies, and infrastructure investments that support higher density mixed-use, residential, and employment development near transit in order to facilitate walking, bicycling, and transit use.

The Project also includes numerous energy conservation measures including, but not limited to, adherence to the Green Buildings Standards Code and California Building Energy Efficiency Standards. These measures would act to reduce Project-related area and mobile source emissions; however, emissions generated during operation (discussed below) are expected to exceed BAAQMD significance thresholds.

As indicated above, the Project would not result in unplanned regional growth, as it is consistent with the City's General Plan land use designations and ABAG growth projections. Accordingly, the Project would not conflict with implementation of the applicable air quality plan. This impact would be ***less than significant***.

Impact AQ-2a: Construction Criteria Air Pollutant Emissions. Construction activities at the Project site could result in the generation of regional criteria pollutant emissions during construction in excess of BAAQMD thresholds. (LTS/M)

Construction of the Project has the potential to create air quality impacts through the use of heavy-duty construction equipment, construction worker vehicle trips, and truck hauling trips. In addition, fugitive dust emissions would result from site disturbance, whereas fugitive ROG emissions would result from application of architectural coatings and paving. The assessment of construction air quality impacts considers each of these potential sources. Construction assumptions are provided in Appendix 3.4.

Estimated construction emissions are summarized in Table 3.4-6, which shows average daily emissions for each year of construction, based on the Project schedule and phasing information provided by the Project Sponsor. It was assumed that the duration of construction would be approximately four years and would consist of three primary phases that correspond to each of the new Project buildings. As discussed under *Methods for Analysis*, construction at each building would require four or five sub-phases.

Table 3.4-6. Estimated Unmitigated Average Daily Construction Emissions (pounds per day)

Average Daily Emissions per Year[a]	ROG	NO_X	CO	PM10		PM2.5	
				Dust	Exhaust	Dust	Exhaust
2016	2	12	85	1	< 1	< 1	< 1
2017	12	10	42	1	< 1	< 1	< 1
2018	12	14	83	2	< 1	< 1	< 1
2019	25	15	61	1	< 1	< 1	< 1
2020	43	5	16	< 1	< 1	< 1	< 1
BAAQMD Thresholds	54	54	--	BMPs	82	BMPs	54
Exceed Thresholds?	*No*	*No*	--	--	*No*	--	*No*

Notes:

a. Refer to Appendix 3.4 for a summary of phases assumed during each construction period.

b. BMPs = best management practices.

As shown in Table 3.4-6, construction of the Project would not exceed BAAQMD's numeric thresholds for any pollutants in any year. According to data provided by the Project Sponsor, construction would require a large number of heavy-duty, off-road types of equipment that would operate many hours each day for a substantial portion of the corresponding construction phase. These assumptions would typically contribute to a high level of emissions; however, the Project Sponsor, as discussed in Chapter 2, *Project Description*, has committed to using only equipment with Tier 4 compliant engines, and the emissions in Table 3.4-6 reflect this commitment. The Tier 4 commitment results in criteria pollutant emissions that are substantially lower than would otherwise occur in the absence of Tier 4 compliant engines.

BAAQMD does not have quantitative thresholds for fugitive dust. Instead, the threshold is based on compliance with best management practices (BMPs). Unmitigated fugitive dust could adversely affect local and regional PM10 levels, which would result in health impairment due to the inhalation of dust. Project fugitive dust emissions would result in a ***potentially significant*** impact.

MITIGATION MEASURES. Because BAAQMD considers fugitive dust emissions to be significant without BMPs, mitigation would be required to control fugitive dust. BAAQMD-recommended BMPs for fugitive dust are outlined in Mitigation Measure AQ-2.1.

Table 3.4-7 summarizes estimated construction emissions after the incorporation of the dust mitigation measures indicated in Mitigation Measure AQ-2.1.

Table 3.4-7. Estimated Mitigated Construction Emissions (pounds per day)

				PM10		PM2.5	
Average Daily Emissions by Year	**ROG**	**NO_X[a]**	**CO**	**Dust**	**Exhaust[a]**	**Dust**	**Exhaust[a]**
2016	2	12	85	< 1	< 1	< 1	< 1
2017	12	10	42	< 1	< 1	< 1	< 1
2018	12	14	83	1	< 1	< 1	< 1
2019	25	15	61	1	< 1	< 1	< 1
2020	43	5	16	< 1	< 1	< 1	< 1
BAAQMD Thresholds	54	54	-	BMPs	82	BMPs	54
Exceed Thresholds?	*No*	*No*	-	-	*No*	-	*No*

Notes:

[a] Mitigated emissions assume that on-site dust emissions would be reduced by 88.3 percent, per BAAQMD BMPs. The BMPs would not affect offsite dust emissions that would occur as a result of employee vehicles and haul trucks traveling on highways and roads to get to the Project site.

Mitigation Measure GHG-1.1 in Section 3.5, *Greenhouse Gas Emissions*, would require the use of alternative fuel for construction diesel equipment. The effects of this measure are not included in Table 3.4-7, but its implementation would lower particulate emissions without increasing NO_X emissions. [37]

As shown in Table 3.4-7, fugitive dust emissions would be reduced by 88.3 percent after implementation of the BAAQMD dust control measures specified in Mitigation Measure AQ-2.1. Emissions of all other pollutants would remain unchanged. Because dust emissions would be mitigated through the BMPs, this impact is considered to be ***less than significant with mitigation***.

AQ-2.1: Implement BAAQMD Basic Construction Mitigation Measures to Reduce Construction-Related Dust. The Project Sponsor shall require all construction contractors to implement the basic construction mitigation measures recommended by BAAQMD to reduce fugitive dust emissions. Emission reduction measures shall include, at a minimum, the following measures. Additional measures may be identified by BAAQMD or contractor as appropriate.

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. Recycled water, to be purchased through advance arrangement with the City of Redwood City or the City of Palo Alto, shall be used to water all exposed surfaces.
- All haul trucks transporting soil, sand, or other loose material offsite shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- A publicly visible sign shall be posted with the telephone number and name of the person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

[37] The use of alternative fuels can sometimes lower emissions of one pollutant but increase emissions of another pollutant compared to the use of conventional diesel or gasoline. The net air quality effects depend on which alternative fuel is used. For example, compared to conventional diesel, biodiesel will have lower particular matter and hydrocarbon emissions, but can increase NO_X emissions, depending on blend. One EPA study showed that B100 could increase NO_X by 10 percent compared to conventional diesel but that B20 could lower or raise NO_X emissions by 2 percent either direction. Mitigation Measure GHG-1.1 only includes B20 (not B100) and B20 has a very small effect on NO_X. Clean natural gas (CNG) and electricity would reduce hydrocarbons, particulate, and NO_X emissions compared to conventional diesel fuel. Thus Mitigation Measure GHG-1.1 is expected to lower GHG emissions as well as particulate and hydrocarbon emissions while not increasing NO_X emissions. The referenced EPA study is available at: http://cta.ornl.gov/bedb/biofuels/biodiesel/Average_Biodiesel_Emissions_Compared_to_Conventional_Diesel.xls.

Impact AQ-2b: Operational Criteria Air Pollutant Emissions. Operational activities at the Project site could result in the generation of regional criteria pollutant emissions during operation in excess of BAAQMD thresholds. (LTS/M)

Operation of the Project has the potential to create air quality impacts primarily associated with mobile, area, and energy sources. Motor vehicle traffic would include daily trips to and from the Campus by employees, vendors and contractors, and visitors. Area sources include landscaping equipment, off-gassing during the reapplication of architectural coatings, and consumer products (solvents, cleaning supplies, etc.). Energy sources include natural gas combustion for space and water heating. Each of these sources was taken into account in calculating the Project's long-term operational emissions. Building 21 would be designed to LEED Gold 2009 standards. A number of other sustainability features would be included in the Project design, as discussed in Chapter 2, *Project Description.*

Project-generated VMT in 2020 were obtained from a memorandum prepared by Fehr & Peers and data from the Project Sponsor, as discussed under *Methods for Analysis*, above. VMT in 2040 was conservatively assumed to be equal to VMT in 2020. This would be a conservative assumption because, in the event that ConnectMenlo is adopted, VMT in 2040 would very likely be lower because of a shift to higher-density housing and land use patterns.

Estimated operational emissions for the baseline scenario and Project scenario are summarized in Table 3.4-8. As discussed above, existing mobile-source emissions are assumed to be zero, because this EIR assumes there are no active employees at the TE Connectivity Campus. Project-generated mobile source emissions were calculated for two build out years (2020 and 2040), because the rate of emissions from Project-employee vehicles is expected to decrease between 2020 and 2040 due to advancements in vehicle technology and the turnover of older, more heavily polluting vehicles. Thus, it is more comprehensive to assess mobile source emissions for two separate years with differing emission rates to determine the effect of the Project.

The difference in total operational emissions (area + energy + mobile sources) between the Project and the baseline uses represents the net impact of the Project. All Project structures were conservatively assumed to be fully occupied immediately following construction.

As shown in Table 3.4-8, NO_X emissions for the Project would exceed BAAQMD's mass emissions threshold in 2020 but not in 2040. Exceedances of BAAQMD thresholds are shown in underline in the table. The vast majority of the emissions exceedance for NOx would be the result of emissions generated by mobile sources (trips from employee and visitor vehicles; vendor, contractor, and delivery vehicles; and employer-sponsored shuttle and vanpool vehicles). This is considered a ***potentially significant*** impact.

Although Project design features and LEED certification for Building 21 would contribute to criteria pollutant reductions, NO_X emissions would still exceed BAAQMD's mass emissions thresholds of 54 pounds per day. For NO_X emissions from energy sources, the Project would actually result in a net reduction in emissions, because the Project emissions would be lower than the existing site emissions. That net reduction is more than offset, however, by Project mobile sources.

Table 3.4-8. Estimated Operational Average Daily Emissions[a]

Condition/Source	ROG	NO_X	CO	PM10	PM2.5
Baseline Emissions					
Area Sources[b]	21	<1	<1	<1	<1
Energy Sources[b]	2	22	18	2	2
Mobile Sources[b]	0	0	0	0	0
Total Baseline Emissions[b]	23	22	18	2	2
Project Emissions					
Area Sources[c]	28	<1	<1	<1	<1
Energy Sources[c]	1	10	8	<1	<1
Mobile Sources in 2020[c]	40	75	294	17	7
Mobile Sources in 2040[c]	20	43	131	17	7
Total Project Emissions in 2020[c]	69	85	302	18	8
Total Project Emissions in 2040[c]	49	53	139	17	8
Net Emissions					
Area Sources[d]	7	<1	<1	<1	<1
Energy Sources[d]	-1	-12	-10	-1	-1
Mobile Sources in 2020[d]	40	75	294	17	7
Mobile Sources in 2040[d]	20	43	131	17	7
Total Net Emissions – 2020[e]	46	63	284	16	6
Total Net Emissions – 2040[e]	26	31	121	16	6
Threshold	54	54	CAAQS[f]	82	82

Notes:
Exceedances of BAAQMD thresholds are shown in underline.
a. pounds per day
b. These are emissions associated with the baseline conditions at the TE Connectivity Campus and will be replaced by Project.
c. These are emissions associated with the Project only for year 2020 and 2040.
d. These are the differences in emissions between the Project in 2020 and 2040 and the baseline conditions for each type of emissions source.
e. This is the total difference in emissions (i.e., the sum of all three emissions sources combined) between the Project in 2020 and 2040 and the baseline conditions.
f. Refer to Impact AQ-4b for significance determination.

MITIGATION MEASURES. The requirement for operational offsets would require the procurement of annual offsets until Project decommissioning. Implementing offsets to cover operational NO_X emissions over the BAAQMD thresholds would result in total fees of approximately $104,200. This assumes that NOx emissions associated with the Project would decrease linearly between the 2020 net emissions level (63 pounds/day) and the 2040 emissions level (31 pounds/day). Under this assumption, Project emissions would exceed the BAAQMD NOx threshold between 2020 and 2025, while the threshold would not be exceeded between 2026 and 2040. During the years of exceedance, the offset cost would be equal to the difference between Project emissions and the BAAQMD NOx threshold multiplied by the emissions fee.[38] The actual fees needed to offset emissions would be calculated by the Project Sponsor using the most recently updated data for each year and then reviewed and approved by the City.

Purchasing offsets, through the implementation of Mitigation Measure AQ-2.2, would reduce emissions from Project operations by entering into a mitigation contract with the City and funding eligible projects within the city. With implementation of this mitigation, the Project would result in a ***less-than-significant*** impact with respect to NO_X operational emissions.

AQ-2.2: Offset NO_X Emissions Generated during Project Operation that Are above the BAAQMD NO_X Average Daily Emission Threshold. The Project Sponsor shall, prior to occupancy of the first building within the Project site, enter into an agreement with the City to develop an alternative or complementary offsite mitigation program to offset operational NO_X emissions to the level established by the BAAQMD thresholds for the years in which the Project's emissions exceed the BAAQMD threshold. The offsite mitigation program shall require the Project Sponsor to provide a one-time payment to the City to establish a program to fund emissions reduction projects through grants and similar mechanisms within the city of Menlo Park. The amount of such payment shall be based on the then-current BAAQMD Carl Moyer Program cost-effectiveness limit multiplied by emissions that exceed BAAQMD's average daily threshold for each year that emissions exceed the threshold plus a 5 percent administrative fee to fund procurement of offsite emissions reductions for the Project's projected operational emissions.

Potential projects shall be limited to those that will reduce emissions for each year in which the projects' emissions exceed the BAAQMD threshold through the end of 2025, which is when the Project's operational emissions are projected to be below the average daily thresholds, including, but not limited to, the following:

- Alternative-fuel, low-emissions school buses, transit buses, and other vehicles
- Diesel engine retrofits and repowers
- Bike-sharing programs
- Electric vehicle charging stations and plug-ins

All offsite reductions must be quantifiable, verifiable, and enforceable. The Project Sponsor shall engage a qualified air quality expert to coordinate with the City to identify a list of potential projects that would be eligible for funding. Emissions reduction projects shall be funded so that the Project's emissions are reduced each year until the end of 2025. The air quality expert retained by the Project Sponsor shall provide a report within one year of occupancy of the first building within the Project site, identifying the projects that were funded

[38] The current emissions fee is $18,030/weighted ton of criteria pollutants (NO_X + ROG + [20*PM due to exhaust]).

and associated NO_X emissions expected to be realized for each year out until the end of 2025. Annual reporting of the implementation of emissions reduction projects shall be required until the Project's emissions are less than the BAAQMD threshold without the offsets.

If a sufficient number of emissions reduction projects are not identified to meet the required performance standards in the city of Menlo Park, the Project Sponsor shall consult with a qualified air quality expert to ensure conformity is met through some other means, thereby achieving the performance standard of net zero operational emissions in excess of BAAQMD's average daily thresholds through 2025, including, but not limited to, payment of a one-time mitigation offset fee to BAAQMD's Strategic Incentives Division plus a 5 percent administrative fee to fund one or more emissions reduction projects within the San Francisco Bay Area Air Basin. Reporting for any emissions reduction projects outside the city shall be completed on the same schedule as indicated above for emissions reduction projects in the city.

If annual reports indicate that emissions reductions do not adequately reduce project emissions to a level below the BAAQMD threshold for any year, then a penalty of 200 percent shall be imposed, which will require the Project Sponsor to obtain an additional year of offsets, based on the amount of emissions by which the Project's emissions exceed the BAAQMD threshold for the next year (e.g., if the 2019 emissions exceed the threshold by 5 tons, then 10 tons of emissions must be provided by 2020).

Impact AQ-3: Result in a Cumulatively Considerable Net Increase of any Criteria Pollutant for which the Project Region is Nonattainment. The Project could result in the generation of criteria pollutant emissions that would result in a cumulatively considerable net increase. (LTS/M)

BAAQMD has identified project-level thresholds to evaluate criteria pollutant impacts (see Table 3.4-5). In developing these thresholds, BAAQMD considered levels at which Project emissions would be cumulatively considerable. As noted in their *CEQA Guidelines.*[39]

> In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary.

The criteria pollutant thresholds presented in Table 3.4-5 therefore represent the maximum emissions the Project may generate before contributing to a cumulative impact on regional air quality. Consequently, exceedances of the project-level thresholds would be cumulatively considerable. As discussed in Impact AQ-2b, operational emissions associated with the Project are expected to exceed BAAQMD's quantitative NOx threshold but would be mitigated to a level below the threshold with implementation of emissions offsets. Because operational emissions would be below the threshold with mitigation, this impact is considered ***less than significant with mitigation***.

A full discussion of cumulative effects is included in the *Cumulative Impacts* section below.

[39] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines*. May. San Francisco, CA.

Impact AQ-4a: Exposure of Existing Sensitive Receptors to Substantial Pollutant Concentrations During Construction. The Project would expose existing sensitive receptors to substantial pollutant concentrations during construction. (LTS/M)

Toxic Air Contaminants

Project construction would generate PM2.5 and DPM, resulting in the exposure of nearby existing sensitive receptors (e.g., residences, schools, parks) to increased PM2.5 concentrations and health risks associated with DPM. Sensitive receptors located adjacent to the Project site are listed in Table 3.4-4. Exposure of these receptors to construction PM2.5 and DPM emissions was assessed by predicting PM2.5 and DPM concentrations at the receptor locations based on the mitigated emissions scenario (i.e., the scenario in which dust emissions have been mitigated by 88.3 percent as a result of BAAQMD BMPs), as this represents the scenario in which receptors would experience exposure to Project-related emissions.

PM2.5 Analysis

The results of the PM2.5 analysis are summarized in Table 3.4-9 and are compared to BAAQMD's project-level PM2.5 threshold. PM2.5 concentrations at residential, school, and recreational receptors during construction, with inclusion of the dust reduction measures specified in Mitigation Measure AQ-2.1, would be less than the BAAQMD threshold by a substantial margin (one order of magnitude). In addition, Mitigation Measure GHG-1.1, which would require implementation of BAAQMD's best management practices for construction, including the use of alternative-fuel construction vehicles/equipment (at least 15 percent of the fleet).. However, the reduction value has not been quantified because it is unknown at this time exactly which alternative fuels would be used.

As shown in Table 3.4-9, the Project would not result in PM2.5 concentrations in excess of BAAQMD's threshold during construction with Mitigation Measure AQ-2.1. This would be a ***less-than-significant*** impact.

Table 3.4-9. Project-Level PM2.5 Exposure during Construction with Mitigation[a]

Receptor	Maximum Annual PM2.5 Concentration (µg/m^3) with Mitigation Measure AQ-2.1
Residential	0.03
Schools	0.02
Recreational	0.01
BAAQMD Threshold	0.3

Notes:
[a.] See Table 3.4-4 and Appendix 3.4 for additional information on the receptors modeled in the analysis.

DPM Analysis

Cancer and chronic health risks are associated with long-term exposure to diesel exhaust. The health risks from exposure to construction DPM emissions were assessed by predicting cancer and chronic non-cancer risks at individual offsite receptor locations. Exposure to carcinogens is expressed in terms of the incremental number of people per 1 million who may be expected to contract cancer as a result of the given exposure to the specific chemicals from this Project alone. The BAAQMD project threshold is an

increased risk of contracting cancer of 10 in 1 million (which means that out of 1 million people exposed to a given level of pollution,10 would be expected to contract cancer).[40] Chronic exposure to non-carcinogens is expressed with use of a HI, which is the ratio of expected exposure level to an acceptable reference exposure level. A HI greater than 1.0 is considered significant.

Because of the proximity of the residential receptors to the Project site, the multi-year construction schedule, and the large scale of construction activity (in terms of the number of pieces of equipment and their daily operating times), cancer risks have the potential to be elevated in comparison to other projects that may not have these variables. In addition, the meteorological conditions at this site result in northerly winds, which would exacerbate pollutant concentrations at the sensitive receptors south of the Project site. However, as discussed above, the Project Sponsor has committed to using Tier 4 compliant engines in all heavy-duty equipment onsite, which would result in lower PM2.5 exhaust emissions than would otherwise occur without the Tier 4 commitment and, thus, lower hazard index and cancer risk values.

The results of the health risk assessment are summarized in Table 3.4-10 and are compared to BAAQMD's project-level DPM thresholds. A detailed summary of the methodology used in estimating risk is provided in Appendix 3.4.

Table 3.4-10. Project-Level Cancer and Chronic (HI) Risks during Construction with Mitigation[a]

	With Mitigation Measures AQ-2.1	
Receptors	**Non-Cancer HI**	**Increased Cancer Risk (per million)**
Residential	0.005	6.6
Schools	0.004	0.5
Recreational	0.002	0.2
BAAQMD Thresholds	1	10

Notes:
[a] See Table 3.4-4 and Appendix 3.4 for additional information on the receptors modeled in the analysis.

As shown in Table 3.4-10, construction of the Project would not result in any increases in cancer risk that would be in excess of BAAQMD thresholds at residential, school, or recreational receptors near the Project site. Because the hazard index and cancer risk would not exceed the applicable thresholds, this would be a ***less-than-significant*** impact.

Asbestos

Asbestos is a set of naturally occurring minerals that was previously used in building construction due to its heat resistance and strong insulating properties. Exposure to asbestos, however, has been shown to cause a number of disabling and fatal diseases, including lung cancer, mesothelioma, and pleural plaques. Demolition of the existing buildings may expose workers to asbestos if the material was used during construction of the buildings. The Project would comply with BAAQMD Regulation 11, Rule 2, which would control emissions of asbestos to the atmosphere during demolition activities. Accordingly, sensitive receptors or other people would not be exposed to asbestos, and this impact would be ***less than significant***.

[40] BAAQMD estimates that, in 2005, approximately 50 percent of the population within the San Francisco Bay Area had an ambient cancer risk of 500 in 1 million or more due to existing air pollution. Ambient cancer risks vary, depending on proximity and exposure to toxic air contaminant emissions sources.

Impact AQ-4b: Exposure of Existing Sensitive Receptors to Substantial Pollutant Concentrations from Project Operation. The Project would not expose existing sensitive receptors to substantial pollutant concentrations during operation. (LTS)

Toxic Air Contaminants

Implementation of the Project does not include siting new sensitive land uses; the Project would be used for office purposes. The Project is assumed to include installation of emergency diesel generators. Because BAAQMD does not issue a permit to operate for equipment that contributes to a risk of greater than 10 in one million, it is anticipated that generators associated with the Project would not contribute maximum cancer risks in excess of BAAQMD's threshold of 10 in one million. In addition, there would be no substantial source of diesel particulate matter from Project operation, because the primary component of operation (employee and visitor vehicle trips) would not involve an appreciable source of diesel vehicles. Therefore, there would be no risk of exposure of substantial pollutant concentrations to sensitive receptors during Project operation. This impact would be ***less than significant.***

Carbon Monoxide Hot-Spots

As discussed above, BAAQMD cites examples of intersections where vertical or horizontal mixing is limited, which includes tunnels, parking garages, bridge underpasses, natural or urban street canyons, and below-grade roadways.[41] At these categories of intersections, the BAAQMD CO screening criterion is 24,000 vehicles per hour, and at all other intersections the BAAQMD CO screening criterion is 44,000 vehicles per hour.

Continuous engine exhaust may elevate localized CO concentrations, resulting in "hot spots." Receptors exposed to these CO hot spots may have a greater likelihood of developing adverse health effects. CO hot spots are typically observed at heavily congested intersections where a substantial number of gasoline-powered vehicles idle for prolonged durations throughout the day. Peak-hour traffic volumes at intersections in the transportation study area were analyzed to determine whether the Project meets the BAAAQMD screening criteria. Peak hour traffic would be a maximum in the AM Peak Hour under the three "with Project" scenarios modeled for the Project at the intersection of Oak Avenue and Sand Hill Road (with vehicle-per-hour volumes of 30,528 [2020 with Project], 30,576 [2040 with Project with existing General Plan], and 31,360 [2040 with Project with ConnectMenlo]). This intersection is far from the Project site, is not heavily influenced by Project traffic, and is not considered to be any of the examples of intersections where vertical or horizontal mixing is limited. The maximum volumes in 2020 and in 2040 would be below the 44,000 vehicle per hour screening threshold at intersections where mixing is not limited, by a substantial amount (almost 30 percent). Intersection volumes at all other intersections would be below 24,000, so there would not be any exceedances of either the limited vertical/horizontal mixing threshold (24,000 vehicles per hour), or the non-limited mixing threshold (44,000 vehicles per hour). Thus, the Project would not result in an exceedance of the BAAQMD screening criteria, and CO concentrations would not exceed the CAAQS. This impact would be ***less than significant***.

[41] Bay Area Air Quality Management District. 2011. *California Environmental Quality Act Air Quality Guidelines*. May. San Francisco, CA

Impact AQ-5: Create Objectionable Odors. The Project would not create objectionable odors that would affect a substantial number of people. (LTS)

Although offensive odors rarely cause any physical harm, they can be unpleasant and lead to considerable distress among the public. This distress may often generate citizen complaints to local governments and air districts. Any project with the potential to frequently expose the public to objectionable odors would be deemed as one having a significant impact. According to ARB,[42] land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities, and manufacturing facilities.

Potential odor sources from Project operations would include diesel exhaust from weekly trash pick-up and the use of architectural coatings during routine maintenance; limited odors may also result from cooking appliances. The Project would involve the use of a recycled water system (subject to the approval of the City's building official) that would use wastewater generated at the Project site for non-potable purposes, such as toilets, urinals, and landscape irrigation. The recycled water system would be designed with odor control; as such, no offensive odors would be expected from the system.

When compared to existing odor sources in the surrounding area, which include commercial and industrial uses, odor impacts from Project operation would be similar. Accordingly, Project operation is not expected to result in odor impacts that would exceed BAAQMD's odor thresholds (see Table 3.4-5).

Potential odor sources during construction activities include diesel exhaust from heavy-duty equipment, and the use of architectural coatings. Construction-related odors near existing receptors would be temporary in nature and dissipate as a function of distance. Accordingly, construction and operation of the Project are not expected to result in odor impacts that would exceed BAAQMD's odor thresholds. This impact is considered ***less than significant***.

Cumulative Impacts

The geographic context for a discussion of cumulative impacts on regional air quality, such as ozone, is the SFBAAB, and for localized air quality, such as for CO and PM10, the geographic context is the Project vicinity (including the city and San Mateo County). This cumulative analysis examines the effects of the Project, in combination with other current projects, probable future projects, and projected future growth within the SFBAAB, San Mateo County, and the city in the next 20 years.

Odors are not addressed cumulatively for the Project because the types of uses anticipated to be developed or allowed under the proposed zoning would not generate significant sources of odor. In addition, the Project site is not located in an area where existing or future odor-producing uses are proposed. Therefore, the additive effect of assessing cumulative odor impacts is not relevant for this Project and would not be cumulatively considerable.

As discussed under Impact AQ-3, the BAAQMD CEQA Guidelines are applied to the cumulative analysis of impacts on regional air quality. Based on the justification that BAAQMD utilized in establishing its thresholds of significance for air quality pollutants, it is not necessary to consider the impacts of other foreseeable projects. However, the impact of the demolition of Buildings 307–309 is considered in the cumulative analysis because that activity is a reasonably foreseeable project and located on the Project site.

[42] California Air Resources Board. 2005. *Air Quality and Land Use Handbook.* May.

Impact C-AQ-1: Conflict with Air Quality Plan. The Project, combined with other development within the city, would not conflict with or obstruct implementation of the applicable air quality plan. (LTS)

As discussed above, the 2010 Clean Air Plan is based on ABAG's projections. Under BAAQMD methodology, for consistency with the 2010 Clean Air Plan, a project or plan must demonstrate that the population or VMT assumptions contained in the Clean Air Plan would not be exceeded and that the project or plan implements TCMs as applicable. As discussed in Section 3.12, *Population and Housing*, cumulative residential growth in the city would develop 6,084 dwelling units, which, when taken together with the Project's 457 new residents, would result in an increase in resident population of 16,336 (based on the current city persons per household [pph] ratio of 2.61).[43] ABAG projects that the city's population will be approximately 43,200 in 2040. Adding the cumulative plus Project growth of 16,336 to the current population of 33,273 would result in a total city population of 49,609 persons in 2040, which is above ABAG projections. However, the Project's contribution towards growth between 2015 and 2040 would be 2.4 percent and would not be considered a cumulatively considerable contribution. This would therefore be considered a ***less-than-significant*** impact.

Impact C-AQ-2a: Cumulative Criteria Pollutants during Construction. Construction activities associated with the demolition of Buildings 307–309 could generate substantial NO_X emissions in excess of BAAQMD threshold. (LTS)

As discussed in Chapter 2, *Project Description*, demolition of Buildings 307–309 is considered a reasonably foreseeable project. As discussed above under Impact AQ-2a, Project construction would not generate criteria pollutant emissions that would exceed the applicable BAAQMD thresholds. Similar to the Project, the demolition activities associated with Buildings 307–309 would result in criteria pollutant emissions from on-road and off-road equipment exhaust that could result in exceedances of BAAQMD thresholds. These criteria pollutant emissions would occur before Project construction activities. Thus, emissions from demolition activities are considered in isolation for this analysis of mass criteria pollutant emissions because an overlap with Project construction activities is not anticipated at this time. Emissions associated with demolition of Buildings 307–309 are shown in Table 3.4-11 for 2016, the year in which the activities would occur. The analysis of emissions associated with demolition activities assumes that the Project Sponsor would use primarily equipment with Tier 4 compliant engines, as discussed in Chapter 2, *Project Description*. Refer to Appendix 3.4 for the list of construction equipment that was assumed for the demolition activities analysis and the specific equipment that would have Tier 4 compliant engines.

As shown in Table 3.4-11, demolition activities associated with Buildings 307–309 would not result in significant impacts in 2016 because emissions would be below the BAAQMD threshold by a substantial margin for all pollutants. Consequently, the cumulative effect of this reasonably foreseeable project is considered to be ***less than significant***.

[43] The 16,336 new residents in the City = 457 residents resulting from the Project + (6,084 dwelling units x 2.61 pph).

Table 3.4-11. Estimated Average Daily Construction Emissions Associated with Demolition of Buildings 307–309 (pounds per day)

				PM10		PM2.5	
Average Daily Emissions per Year[a]	**ROG**	**NO_X**	**CO**	**Dust**	**Exhaust**	**Dust**	**Exhaust**
Demolition of Buildings 307–309 (2016)	3	22	67	2	< 1	< 1	< 1
BAAQMD Thresholds	54	54	--	BMPs	82	BMPs	54
Exceed Thresholds?	*No*	*No*	--	--	*No*	--	*No*

Impact C-AQ-2b: Cumulative Criteria Pollutants during Operation. Operational activities associated with the Project could generate substantial ROG, NO_X, and PM10 emissions in excess of BAAQMD thresholds. (LTS/M)

As discussed above, the BAAQMD's project-level thresholds of significance also represent levels at which a project's emissions would be cumulatively considerable. Consequently, exceedances of the project-level thresholds would be cumulatively considerable. As discussed in Impact AQ-2b, Project operational emissions of NO_X are expected to exceed BAAQMD's quantitative thresholds but would be mitigated to a level below the threshold with implementation of Mitigation Measure AQ-2.2, which would require the Project Sponsor to offset NO_X emissions. The demolition of Buildings 307–309 would not involve an operational component, so, unlike the assessment of cumulative construction emissions, the assessment of cumulative operational emissions looks only at the Project's emissions. Because Project operational emissions would not exceed the BAAQMD project- or cumulative-level thresholds with mitigation, this cumulative impact would be ***less than significant with mitigation***.

Impact C-AQ-3a: Cumulative Health Risks during Construction. Cumulative development in the Project vicinity would expose existing sensitive receptors to substantial pollutant concentrations during construction. (LTS)

Consistent with BAAQMD's CEQA Guidelines, cumulative exposure to TACs was evaluated by examining the exposure of surrounding sensitive receptors to the cumulative effect of existing, Project construction, and reasonably foreseeable future sources of TAC emissions.

There are multiple cumulative TAC emission sources that would be within 1,000 feet of sensitive receptors including the following:

- **Existing sources**: There are multiple existing stationary and roadway sources within 1,000 feet of the Project that generate TACs. Google Earth map files and distance multipliers provided by BAAQMD[44] were used to estimate excess impacts for existing stationary and roadway sources.
- **Project sources**: The Project would contribute TAC emissions during construction. The methods used to estimate Project TAC emissions are described above in the assessment of Project-level impacts.

[44] Bay Area Air Quality Management District. No date. Tools and Methodologies. Available: <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools>. Accessed: February 10, 2016.

- **Cumulative land use development**: As discussed above, demolition of Buildings 307–309 would be considered a reasonably foreseeable project that would occur at the same location as the Project site. To ensure that a comprehensive assessment of Project-related activities are accounted for in the analysis, the health risks associated with demolition of Buildings 307–309 have been calculated. No other development has been specifically assessed as part of the cumulative analysis. The demolition activities would occur within the same year as the Project and thus, the hazard index, cancer risk, and PM2.5 exposure from these activities in conjunction with the Project are assessed and presented.

The existing setting, the Project, and cumulative TAC sources could contribute to a cumulative health risk to sensitive receptors in the vicinity of the Project site. The results of the cumulative impact assessment are summarized in Table 3.4-12. Individual source contributions are provided in Appendix 3.4.

Table 3.4-12. Cumulative Toxic Air Contaminant Health Risks[a]

Parcel	Non-Cancer Hazard Index	Increased Cancer Risk (per million)	PM2.5 Exposure (µg/m^3)
Contribution from Existing Sources			
Residential	0.03	24.8	0.27
Schools	0.08	80.7	0.77
Recreational	0.03	24.8	0.27
Contribution from Project Construction and Demolition of Buildings 307–309			
Residential	0.007	8.4	0.03
Schools	0.004	0.5	0.02
Recreational	0.003	0.2	0.01
Cumulative Totals			
Residential	0.037	33.2	0.30
Schools	0.084	81.2	0.79
Recreational	0.033	25.0	0.28
BAAQMD Thresholds	10.0	100.0	0.8

Notes:

[a] These health risks are based on mitigated emissions. Onsite dust emissions were assumed to be reduced by 88.3 percent, per BAAQMD BMPs. The BMPs would not affect offsite dust emissions, however.

µg/m^3 = micrograms per cubic meter.

As shown in Table 3.4-12, cumulative hazard index, cancer risk, and PM2.5 concentrations at residential, school, and recreational receptors would not exceed BAAQMD thresholds. For the school receptor, the PM2.5 concentration (0.79 $\mu g/m^3$) would come close to the BAAQMD threshold but would not exceed it. The vast majority of the PM2.5 concentration contribution at the school receptor is from existing sources (namely, US 101). Project construction and demolition of Buildings 307–309 would contribute less than 2 percent to the PM2.5 concentration at the school receptor. The hazard index and cancer risk at the school receptor would be below the applicable thresholds by a wider margin. At recreational and residential receptors, the primary existing sources are Bayfront Expressway and US 101. At these receptors, hazard index, cancer risk, and PM2.5 concentrations would be below the applicable BAAQMD thresholds by a substantial margin. This is considered a ***less-than-significant*** cumulative impact because the Project, in conjunction with other development in the vicinity, would not result in a cumulatively significant hazard index, cancer risk, or PM2.5 concentration.

Impact C-AQ-3b: Cumulative Health Risks during Operation. Cumulative development in the Project vicinity would not expose existing sensitive receptors to substantial pollutant concentrations during operation. (LTS)

Toxic Air Contaminants

As discussed under Impact AQ-4b, the Project would not involve generators that contribute maximum cancer risks in excess of BAAQMD's threshold of 10 in one million or an appreciable amount of diesel vehicles. Thus, Project operation would not result in cumulatively considerable increases of the non-cancer HI, cancer risk, or annual PM 2.5 concentrations. The cumulative impact on health risks at sensitive receptors within 1,000 feet of the Project site is, therefore, ***less than significant***.

Carbon Monoxide Hot-Spots

Cumulative growth in the city could lead to increased local CO concentrations from vehicular traffic. As discussed above under Impact AQ-4b, maximum cumulative peak hour traffic (that is, traffic generated by the Project and other development in the area) would be less than 31,400 vehicles per hour at the highest-volume intersection (Oak Avenue and Sand Hill Road) for all "with Project" scenarios. Thus, traffic volumes in 2020 and 2040 would be below the 44,000 vehicle per hour screening threshold at the highest volume intersection by a substantial amount (almost 30 percent). The 44,000 vehicle per hour threshold applies, because the intersection of Oak Avenue and Sand Hill Road is not an example of an intersection where vertical or horizontal mixing is limited. Intersection volumes at all other intersections would be below 24,000, so there would not be any exceedances of either the limited vertical/horizontal mixing threshold (24,000 vehicles per hour), or the non-limited mixing threshold (44,000 vehicles per hour). Thus, the Project's cumulative impact on local CO concentrations is ***less than significant***.