4.2 Air Quality

This section describes the existing air quality conditions of the 123 Independence Drive Residential Project (project) site and vicinity, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures (MMs) to minimize impacts from implementation of the project.

As discussed in Chapter 2, Introduction, and Chapter 4, Environmental Analysis, two Notices of Preparation (NOPs) were circulated for this environmental impact report (EIR), one in January and February 2021, and one in September and October 2021. The Sequoia Union High School District submitted written comments in response to both NOPs identifying concerns with project-specific and cumulative air quality impacts on TIDE Academy, located approximately 0.20 miles east of the project site, and Menlo-Atherton High School, located approximately 1.7 miles south of the site, due to construction activities and the potential increase in traffic volumes within the project area. Both NOPs and the comments received in response to them are provided in Appendix A of this EIR. Information in this chapter addresses the air quality concerns raised in response to the project NOPs.

Information contained in this section is based on the latest version of California Emissions Estimator Model (CalEEMod), Version 2020.4.0, to estimate the project's criteria air pollutant emissions from both construction and operations. In addition, a Health Risk Assessment (HRA) was performed to determine the potential cancer risk and non-cancer health impacts to existing sensitive receptors in proximity to the project due to toxic air contaminant (TAC) emissions from construction and operational activities using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) Version 21112 and the Hotspots Analysis and Reporting Program Version 2 (HARP2). For the relevant data, refer to Appendix C1, Air Quality, Greenhouse Gas Emissions, and Energy Calculations (prepared by Dudek in September 2022), and Appendix C2, Health Risk Assessment Data (prepared by Dudek in September 2022).

Additional sources reviewed to prepare this section include the Transportation Impact Analysis, included as Appendix J, the Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) Air Quality Guidelines, the BAAQMD 2017 Clean Air Plan, and the Office of Environmental Health Hazards Assessment's (OEHHA) 2015 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Other sources consulted are listed in Section 4.2.5, References Cited.

4.2.1 Environmental Setting

The project site is located within the boundaries of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB encompasses all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, as well as the southern portions of Solano and Sonoma Counties.

Climate and Meteorology

Air quality is a function of the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features that influence pollutant movement and dispersal. Atmospheric conditions such as wind speed, wind direction, atmospheric stability, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants, and consequently affect air quality.

The climate of the SFBAAB is determined largely by a high-pressure system that is usually present over the eastern Pacific Ocean off the west coast of North America. During winter, the Pacific high-pressure system shifts southward, allowing more storms to pass through the region. During summer and early fall, when few storms pass through the region, emissions generated within the San Francisco Bay Area can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants, such as ozone (O_3), and secondary particulates, such as nitrates and sulfates.

In the SFBAAB, temperature inversions can often occur during the summer and winter months. An inversion is a layer of warmer air over a layer of cooler air that traps and concentrates pollutants near the ground. As such, the highest air pollutant concentrations in the SFBAAB generally occur during inversions (BAAQMD 2017a). The project site is located in the Santa Clara Valley climatological subregion. Specific conditions for the subregion are described in the BAAQMD CEQA Air Quality Guidelines (BAAQMD 2017a). The air pollution potential of the Santa Clara Valley is high. Warm summer temperatures, stable air, and mountains surrounding the valley combine to promote O_3 formation. In addition to the many local sources of pollution, O_3 precursors from San Francisco, San Mateo, and Alameda Counties are carried by prevailing winds into the Santa Clara Valley. The valley tends to channel pollutants to the southeast. In addition, on summer days with low level inversions, O_3 can be recirculated by southerly drainage flows in the late evening and early morning and by the prevailing northwesterlies in the afternoon. A similar recirculation pattern occurs in the winter, affecting levels of CO and particulate matter. This movement of the air up and down the valley significantly increases the impact of the pollutants (BAAQMD 2017a).

Site-Specific Meteorological Conditions

The local climate in San Mateo County is characterized as cool and foggy which is prevalent along the western coast of the peninsula, particularly during the summer. Summertime average daily temperatures are moderate along the west coast and warm in the county's east side. In the winter, average daily temperatures across the county range from mild to moderate. Winds are mild, with the highest wind speeds focused along the western coast. Rainfall averages approximately 20 to 25 inches per year at lower elevations (BAAQMD 2019).

Pollutants and Effects

Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The national and California standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include O_3, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and lead. In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants. These pollutants, as well as toxic air contaminants (TACs), are discussed in the following paragraphs.[1]

Ozone. O_3 is a strong-smelling, pale blue, reactive, toxic chemical gas consisting of three oxygen atoms. It is a secondary pollutant formed in the atmosphere by a photochemical process involving the sun's energy and O_3

1 The descriptions of the criteria air pollutants and associated health effects are based on the U.S. Environmental Protection Agency's "Criteria Air Pollutants" (EPA 2021a), as well as the California Air Resources Board's "Glossary" (CARB 2019a) and "Fact Sheet: Air Pollution Sources, Effects and Control" (CARB 2009).

precursors. These precursors are mainly oxides of nitrogen (NO_X) and volatile organic compounds (VOCs) (also termed reactive organic gas [ROG]). The maximum effects of precursor emissions on O_3 concentrations usually occur several hours after they are emitted and many miles from the source. Meteorology and terrain play major roles in O_3 formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. O_3 exists in the upper atmosphere O_3 layer (stratospheric O_3) and at the Earth's surface in the troposphere (ground-level O_3).[2] The O_3 that the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) regulate as a criteria air pollutant is produced close to the ground level, where people live, exercise, and breathe. Ground-level O_3 is a harmful air pollutant that causes numerous adverse health effects and is thus considered "bad" O_3. Stratospheric, or "good," O_3 occurs naturally in the upper atmosphere, where it reduces the amount of ultraviolet light (i.e., solar radiation) entering the Earth's atmosphere. Without the protection of the beneficial stratospheric O_3 layer, plant and animal life would be seriously harmed.

O_3 in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes (EPA 2013).

Inhalation of O_3 causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms. Exposure to O_3 can reduce the volume of air that the lungs breathe in, thereby causing shortness of breath. O_3 in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. The occurrence and severity of health effects from O_3 exposure vary widely among individuals, even when the dose and the duration of exposure are the same. Research shows adults and children who spend more time outdoors participating in vigorous physical activities are at greater risk from the harmful health effects of O_3 exposure. While there are relatively few studies on the effects of O_3 on children, the available studies show that children are no more or less likely to suffer harmful effects than adults. However, there are a number of reasons why children may be more susceptible to O_3 and other pollutants. Children and teens spend nearly twice as much time outdoors and engaged in vigorous activities as adults. Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults. Also, children are less likely than adults to notice their own symptoms and avoid harmful exposures. Further research may be able to better distinguish between health effects in children and adults. Children, adolescents, and adults who exercise or work outdoors, where O_3 concentrations are the highest, are at the greatest risk of harm from this pollutant (CARB 2019b).

Nitrogen Dioxide. NO_2 is a brownish, highly reactive gas that is present in all urban atmospheres. The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide (NO), which is a colorless, odorless gas. NOx plays a major role, together with VOCs, in the atmospheric reactions that produce O_3. NOx is formed from fuel combustion under high temperature or pressure. In addition, NOx is an important precursor to acid rain and may affect both terrestrial and aquatic ecosystems. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers. NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections (EPA 2016b).

A large body of health science literature indicates that exposure to NO_2 can induce adverse health effects. The strongest health evidence, and the health basis for the ambient air quality standards for NO_2, results from controlled human exposure studies that show that NO_2 exposure can intensify responses to allergens in allergic asthmatics. In

2 The troposphere is the layer of the Earth's atmosphere nearest to the surface of the Earth. The troposphere extends outward about 5 miles at the poles and about 10 miles at the equator.

addition, a number of epidemiological studies have demonstrated associations between NO_2 exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses. Infants and children are particularly at risk because they have disproportionately higher exposure to NO_2 than adults due to their greater breathing rate for their body weight and their typically greater outdoor exposure duration. Several studies have shown that long-term NO_2 exposure during childhood, the period of rapid lung growth, can lead to smaller lungs at maturity in children with higher levels of exposure compared to children with lower exposure levels. In addition, children with asthma have a greater degree of airway responsiveness compared with adult asthmatics. In adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease (CARB 2019c).

Carbon Monoxide. CO is a colorless, odorless gas formed by the incomplete combustion of hydrocarbon, or fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the Project location, automobile exhaust accounts for the majority of CO emissions. CO is a nonreactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, which is a typical situation at dusk in urban areas from November to February. The highest levels of CO typically occur during the colder months of the year, when inversion conditions are more frequent.

CO is harmful because it binds to hemoglobin in the blood, reducing the ability of blood to carry oxygen. This interferes with oxygen delivery to the body's organs. The most common effects of CO exposure are fatigue, headaches, confusion and reduced mental alertness, light-headedness, and dizziness due to inadequate oxygen delivery to the brain. For people with cardiovascular disease, short-term CO exposure can further reduce their body's already compromised ability to respond to the increased oxygen demands of exercise, exertion, or stress. Inadequate oxygen delivery to the heart muscle leads to chest pain and decreased exercise tolerance. Unborn babies whose mothers experience high levels of CO exposure during pregnancy are at risk of adverse developmental effects. Unborn babies, infants, elderly people, and people with anemia or with a history of heart or respiratory disease are most likely to experience health effects with exposure to elevated levels of CO (CARB 2019d).

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily from incomplete combustion of sulfur-containing fossil fuels. The main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels.

Controlled human exposure and epidemiological studies show that children and adults with asthma are more likely to experience adverse responses with SO_2 exposure, compared with the non-asthmatic population. Effects at levels near the 1-hour standard are those of asthma exacerbation, including bronchoconstriction accompanied by symptoms of respiratory irritation such as wheezing, shortness of breath, and chest tightness, especially during exercise or physical activity. Also, exposure at elevated levels of SO_2 (above 1 parts per million [ppm]) results in increased incidence of pulmonary symptoms and disease, decreased pulmonary function, and increased risk of mortality. Older people and people with cardiovascular disease or chronic lung disease (such as bronchitis or emphysema) are most likely to experience these adverse effects (CARB 2019e).

SO_2 is of concern both because it is a direct respiratory irritant and because it contributes to the formation of sulfate and sulfuric acid in particulate matter (NRC 2005). People with asthma are of particular concern, both because they have increased baseline airflow resistance and because their SO_2-induced increase in airflow resistance is greater than in healthy people, and it increases with the severity of their asthma (NRC 2005). SO_2 is thought to induce airway constriction via neural reflexes involving irritant receptors in the airways (NRC 2005).

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 can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Coarse particulate matter (PM_{10}) consists of particulate matter that is 10 microns or less in diameter, which is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; 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. Fine particulate matter ($PM_{2.5}$) consists of particulate matter that is 2.5 microns or less in diameter, which is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., from motor vehicles and power generation and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_x), NO_x, and VOCs.

$PM_{2.5}$ and PM_{10} 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. $PM_{2.5}$ and PM_{10} 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 or be absorbed into the bloodstream, causing damage elsewhere in the body. Additionally, these substances can transport adsorbed gases such as chlorides or ammonium into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissue. Suspended particulates also damage and discolor surfaces on which they settle and produce haze and reduce regional visibility.

A number of adverse health effects have been associated with exposure to both $PM_{2.5}$ and PM_{10}. For $PM_{2.5}$, short-term exposures (up to 24-hour duration) have been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. These adverse health effects have been reported primarily in infants, children, and older adults with preexisting heart or lung diseases. In addition, of all of the common air pollutants, $PM_{2.5}$ is associated with the greatest proportion of adverse health effects related to air pollution, both in the United States and worldwide based on the World Health Organization's Global Burden of Disease Project. Short-term exposures to PM_{10} have been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits (CARB 2022).

Long-term exposure (months to years) to $PM_{2.5}$ has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children. The effects of long-term exposure to PM_{10} are less clear, although several studies suggest a link between long-term PM_{10} exposure and respiratory mortality. The International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer (CARB 2022).

Lead. Lead in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline; the manufacturing of batteries, paints, ink, ceramics, and ammunition; and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phaseout of leaded gasoline reduced the overall inventory of airborne lead by nearly 95 percent. With the phaseout of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emissions sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including IQ performance, psychomotor performance, reaction time, and growth. Children are highly susceptible to the effects of lead.

Sulfates. Sulfates are the fully oxidized form of sulfur, which typically occur in combination with metals or hydrogen ions. Sulfates are produced from reactions of SO_2 in the atmosphere and can result in respiratory impairment, as well as reduced visibility.

Vinyl Chloride. Vinyl chloride is a colorless gas with a mild, sweet odor, which has been detected near landfills, sewage plants, and hazardous waste sites, due to the microbial breakdown of chlorinated solvents. Short-term exposure to high levels of vinyl chloride in air can cause nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure through inhalation can cause liver damage, including liver cancer.

Hydrogen Sulfide. Hydrogen sulfide is a colorless and flammable gas that has a characteristic odor of rotten eggs. Sources of hydrogen sulfide include geothermal power plants, petroleum refineries, sewers, and sewage treatment plants. Exposure to hydrogen sulfide can result in nuisance odors, as well as headaches and breathing difficulties at higher concentrations.

Visibility-Reducing Particles. Visibility-reducing particles are any particles in the air that obstruct the range of visibility. Effects of reduced visibility can include obscuring the viewshed of natural scenery, reducing airport safety, and discouraging tourism. Sources of visibility-reducing particles are the same as for $PM_{2.5}$.

Volatile Organic Compounds. Hydrocarbons are organic gases that are formed from hydrogen and carbon and sometimes other elements. Hydrocarbons that contribute to formation of O_3 are referred to and regulated as VOCs (also referred to as reactive organic gases). Combustion engine exhaust, oil refineries, and fossil-fueled power plants are the sources of hydrocarbons. Other sources of hydrocarbons include evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint.

The primary health effects of VOCs result from the formation of O_3 and its related health effects. High levels of VOCs in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons, such as benzene, are considered TACs. There are no separate ambient air quality standards for VOCs as a group.

Non-Criteria Air Pollutants

Toxic Air Contaminants. A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic non-cancer health effects. A toxic substance released into the air is considered a TAC. TACs are identified by federal and state agencies based on a review of available scientific evidence. In the state of California, TACs are identified through a two-step process that was established in 1983 under the Toxic Air Contaminant Identification and Control Act. This two-step process of risk identification and risk management and reduction was designed to protect residents from the health effects of toxic substances in the air. In addition, the California Air Toxics "Hot Spots" Information and Assessment Act, Assembly Bill (AB) 2588, was enacted by the legislature in 1987 to address public concern over the release of TACs into the atmosphere. The law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years.

Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources, such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources, such as automobiles; and area sources, such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and non-carcinogenic effects. Non-carcinogenic effects typically affect one or more target organ systems and may be experienced on either short-term (acute) or long-term (chronic) exposure to a given TAC.

Diesel Particulate Matter. Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas and particle, both of which contribute to health risks. More than 90 percent of DPM is less than 1 micrometer in diameter (about 1/70 the diameter of a human hair), and thus is a subset of $PM_{2.5}$ (CARB 2019f). DPM is typically composed of carbon particles ("soot," also called black carbon) and numerous organic compounds, including over 40 known cancer-causing organic substances. Examples of these chemicals include polycyclic aromatic hydrocarbons, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene (CARB 2019f). The CARB classified "particulate emissions from diesel-fueled engines" (i.e., DPM) (17 CCR 93000) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines: on-road diesel engines, including trucks, buses, and cars, and off-road diesel engines, including locomotives, marine vessels, and heavy-duty construction equipment, among others. Approximately 70 percent of all airborne cancer risk in California is associated with DPM (CARB 2000). To reduce the cancer risk associated with DPM, CARB adopted a diesel risk reduction plan in 2000 (CARB 2000). Because it is part of $PM_{2.5}$, DPM also contributes to the same non-cancer health effects as $PM_{2.5}$ exposure. These effects include premature death; hospitalizations and emergency department visits for exacerbated chronic heart and lung disease, including asthma; increased respiratory symptoms; and decreased lung function in children. Several studies suggest that exposure to DPM may also facilitate development of new allergies (CARB 2019f). Those most vulnerable to non-cancer health effects are children, whose lungs are still developing, and older people, who often have chronic health problems.

Odorous Compounds. Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., roasting coffee). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. In a phenomenon known as odor fatigue, a person can become desensitized to almost any odor, and recognition may only occur with an alteration in the intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved in the land use. People most likely to be affected by air pollution include children, the elderly, athletes, and people with cardiovascular and chronic respiratory diseases. Facilities and structures where these air-pollution-sensitive people live or spend considerable amounts of time are known as sensitive receptors. Land uses where air-pollution-sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residences (sensitive sites or sensitive land uses) (CARB 2005).

The nearest existing sensitive receptors are students and staff at TIDE Academy, approximately 400 feet east of the project site, and the multi-family and single-family residential uses located to the west and south, approximately 1,390 feet and 1,760 feet from the project site, respectively.

4.2.2 Regulatory Framework

Federal Regulations

Criteria Air Pollutants

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The EPA is responsible for implementing most aspects of the Clean Air Act, including setting National Ambient Air Quality Standards (NAAQS) for major air pollutants; setting hazardous air pollutant (HAP) standards; approving state attainment plans; setting motor vehicle emission standards; issuing stationary source emission standards and permits; and establishing acid rain control measures, stratospheric O_3 protection measures, and enforcement provisions. Under the Clean Air Act, NAAQS are established for the following criteria pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a state implementation plan that demonstrates how those areas will attain the NAAQS within mandated time frames. The Clean Air Act identifies two types of national ambient air quality standards. Primary standards provide public health protection, including protecting the health of sensitive receptors. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Hazardous Air Pollutants

The 1977 federal Clean Air Act amendments required the EPA to identify National Emission Standards for Hazardous Air Pollutants to protect public health and welfare. HAPs include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 federal Clean Air Act Amendments, which expanded the control program for HAPs, 187 substances and chemical families were identified as HAPs.

Corporate Average Fuel Economy Standards

In October 2012, the EPA and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce greenhouse gas (GHG) emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 Federal Register [FR] 62624). NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of carbon dioxide (CO_2) per mile for the fleet of cars and light-duty trucks by model year 2025. In August 2022, NHTSA announced that it intends to prepare an environmental impact statement to analyze the potential environmental impacts of new CAFE standards for model years 2027 and beyond for passenger cars and light trucks, and new fuel efficiency standards for model years 2029 and beyond for heavy-duty pickup trucks and vans.

State Regulations

Criteria Air Pollutants

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. As stated previously, an ambient air quality standard defines the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without harm to the public's health. For each pollutant, concentrations must be below the relevant CAAQS before a basin can attain the corresponding CAAQS. Air quality is considered "in attainment" if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded.

California air districts have based their thresholds of significance for CEQA purposes on the levels that scientific and factual data demonstrate that the air basin can accommodate, accounting for existing background pollution, without affecting the attainment date for the NAAQS or CAAQS. Since an ambient air quality standard is based on maximum pollutant levels in outdoor air that would not harm the public's health, and air district thresholds pertain to attainment of the ambient air quality standard, this means that the thresholds established by air districts are also protective of human health.

All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 4.2-1.

Table 4.2-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	Primary[c,d]	Secondary[c,e]
O_3	1 hour	0.09 ppm (180 μg/m³)	—	Same as Primary Standard[f]
	8 hours	0.070 ppm (137 μg/m³)	0.070 ppm (137 μg/m³)[f]	
NO_2[g]	1 hour	0.18 ppm (339 μg/m³)	0.100 ppm (188 μg/m³)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 μg/m³)	0.053 ppm (100 μg/m³)	
CO	1 hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	None
	8 hours	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	
SO_2[h]	1 hour	0.25 ppm (655 μg/m³)	0.075 ppm (196 μg/m³)	—
	3 hours	—	—	0.5 ppm (1,300 μg/m³)
	24 hours	0.04 ppm (105 μg/m³)	0.14 ppm (for certain areas)[g]	—
	Annual	—	0.030 ppm (for certain areas)[g]	—
PM_{10}[i]	24 hours	50 μg/m³	150 μg/m³	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m³	—	
$PM_{2.5}$[i]	24 hours	—	35 μg/m³	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m³	12.0 μg/m³	15.0 μg/m³
Lead[j,k]	30-day Average	1.5 μg/m³	—	—
	Calendar Quarter	—	1.5 μg/m³ (for certain areas)[k]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 μg/m³	
Hydrogen sulfide	1 hour	0.03 ppm (42 μg/m³)	—	—
Vinyl chloride[j]	24 hours	0.01 ppm (26 μg/m³)	—	—
Sulfates	24 hours	25 μg/m³	—	—
Visibility reducing particles	8 hours (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70 percent	—	—

Source: CARB 2016a.

Notes: μg/m[3] = micrograms per cubic meter; mg/m[3]= milligrams per cubic meter; ppm = parts per million by volume; O_3 = ozone; NO_2 = nitrogen dioxide; CO = carbon monoxide; SO_2 = sulfur dioxide; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns.

[a] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m[3] is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] On October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[g] To attain the national 1-hour standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[h] On June 2, 2010, a new 1-hour SO_2 standard was established, and the existing 24-hour and annual primary standards were revoked. To attain the national 1-hour standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[i] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 μg/m[3] to 12.0 μg/m[3]. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 μg/m[3], as was the annual secondary standard of 15 μg/m[3]. The existing 24-hour PM_{10} standards (primary and secondary) of 150 μg/m[3] were also retained. The form of the annual primary and secondary standards is the annual mean averaged over 3 years.

[j] CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[k] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 μg/m[3] as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

CARB's Mobile Source Strategy

On May 16, 2016, CARB released the 2016 Mobile Source Strategy that demonstrates how the state can simultaneously meet air quality standards, achieve GHG emission reduction targets, decrease health risk from transportation emissions, and reduce petroleum consumption over the next fifteen years. The actions contained in the 2016 Mobile Source Strategy will deliver broad environmental and public health benefits, as well as support much needed efforts to modernize and upgrade transportation infrastructure, enhance system-wide efficiency and mobility options, and promote clean economic growth in the mobile sector.

The estimated benefits of the strategy in reducing emissions from mobile sources includes an 80 percent reduction of smog-forming emissions and a 45 percent reduction in DPM. Statewide, the 2016 Mobile Source Strategy would also result in a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels (CARB 2016b).

In September 2019, Governor Newsom signed Senate Bill (SB) 44 which acknowledges the ongoing need to evaluate opportunities for mobile source emissions reductions and requires CARB to update the 2016 Strategy by 2021 and every five years thereafter. Specifically, SB 44 requires CARB to update the 2016 Strategy to include a comprehensive strategy for the deployment of medium- and heavy-duty vehicles for the purpose of meeting air quality standards and reducing GHG emissions. It also directs CARB to set reasonable and achievable goals for reducing emissions by 2030 and 2050 from medium- and heavy-duty vehicles that are consistent with the State's overall goals and maximizes the reduction of criteria air pollutants. In September 2021, CARB developed the 2020 Mobile Source Strategy that, similar to the 2016 Mobile Source Strategy, is a framework to identify the technology trajectories and programmatic concepts to meet our criteria pollutant, GHG, and TAC emission reduction goals from mobile sources. The 2020 Mobile Source Strategy will be incorporated in other planning efforts such as the State Implementation Plan and 2022 Climate Change Scoping Plan Update.

The estimated benefits of the strategy in reducing emissions from mobile sources includes an 82 percent reduction of smog-forming emissions by 2037 and a 66 percent reduction in DPM by 2031. The 2020 Mobile Source Strategy would also result in a 76 percent reduction in GHG emissions by 2045, and 85 percent and 77 percent of passenger cars and heavy-duty trucks would be zero-emission vehicles (ZEV) or plug-in hybrid electric vehicles (PHEV) in 2045 (CARB 2021c).

Advanced Clean Cars Program and Zero-Emissions Vehicle Program

The Advanced Clean Cars (ACC) program (January 2012) is an emission-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The ACC II program establishes the next set of low-emission vehicle and zero-emission vehicle requirements for model years after 2025 to contribute to meeting federal ambient air quality ozone standards and California's carbon neutrality standards (CARB 2021b). By 2035 all new passenger cars, trucks and SUVs sold in California will be zero emissions. The main objectives of ACC II are:

1. Maximize criteria and GHG emission reductions through increased stringency and real-world reductions.
2. Accelerate the transition to zero-emission vehicles through both increased stringency of requirements and associated actions to support wide-scale adoption and use.

An ACC II rulemaking package, which considers technological feasibility, environmental impacts, equity, economic impacts, and consumer impacts, was adopted by CARB in August 2022.

EO S-1-07

Executive Order (EO) S-1-07 (January 2007, implementing regulation adopted in April 2009) sets a declining Low Carbon Fuel Standard for GHG emissions measured in metric tons of CO_2 equivalent (CO_2e) grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020 and 20 percent by 2030 (17 CCR 95480 et seq.). The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel—including extraction/feedstock production, processing, transportation, and final consumption—per unit of energy delivered.

Executive Order B-48-18: Zero-Emission Vehicles

On January 26, 2018, Governor Brown signed EO B-48-18 requiring all State entities to work with the private sector to have at least 5 million ZEVs on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle (EV) charging stations by 2025. It specifies that 10,000 of the EV charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a *Plug-in Charging Station Design Guidebook* and update the *2015 Hydrogen Station Permitting Guidebook* (Eckerle and Jones 2015) to aid in these efforts. All State entities are required to participate in updating the *2016 Zero-Emissions Vehicle Action Plan*, along with the *2018 ZEV Action Plan Priorities Update*, which includes and extends the *2016 ZEV Action Plan* (Governor's Interagency Working Group on Zero-Emission Vehicles 2016, 2018), to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities.

Executive Order N-79-20

Governor Gavin Newsom signed EO N-79-20 in September 2020, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the state will be zero-emissions by 2035. It also sets a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and for all new sales of drayage trucks to be zero emissions by 2035. Additionally, the EO targets 100 percent of new off-road vehicle sales in the state to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulation.

Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions

On December 9, 2021, CARB approved proposed amendments to the SORE Regulations, which would require most newly manufactured small off-road engines (SORE), such as those found in leaf blowers, lawn mowers, and other equipment, be zero emission starting in 2024. Portable generators, including those in recreational vehicles, would be required to meet more stringent standards in 2024 and meet zero-emission standards starting in 2028.

Toxic Air Contaminants

The state Air Toxics Program was established in 1983 under AB 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) HAPs. In 1987, the Legislature enacted the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) to address public concern over the release of TACs into the atmosphere. AB 2588 law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years. TAC emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment, and if specific thresholds are exceeded, the facility operator is required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines (CARB 2000). The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program. These regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. There are several Airborne Toxic Control Measures that reduce diesel emissions, including In-Use Off-Road Diesel-Fueled

Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025). On June 25, 2020, the CARB adopted the final rule for new standards that require the sale of zero-emission heavy-duty trucks, starting with the 2024 model year. The Advanced Clean Trucks rulemaking finalizes standards that were initially proposed on October 22, 2019, and strengthened in a revised proposal on April 28, 2020 (CARB 2021c). The Advanced Clean Trucks would require manufacturers to sell increasing percentages of zero-emission trucks, is expected to reduce the lifecycle emission of GHGs, eliminate tailpipe emissions of air pollutants, and foster a market for zero-emission heavy-duty trucks.

California Health and Safety Code Section 41700

Section 41700 of the Health and Safety Code states that a person shall not discharge from any source whatsoever quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any of those persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property. This Section also applies to sources of objectionable odors.

Regional and Local Regulations

Bay Area Air Quality Management District

The BAAQMD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the SFBAAB, where the project site is located. The clean air strategy of the BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, issuance of permits for stationary sources of air pollution, inspection of stationary sources of air pollution and response to citizen complaints, monitoring of ambient air quality and meteorological conditions, and implementation of programs and regulations required by the federal and California Clean Air Acts.

On April 19, 2017, the BAAQMD adopted the Spare the Air – Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area Final 2017 Clean Air Plan (2017 Clean Air Plan) (BAAQMD 2017b). The 2017 Clean Air Plan provides a regional strategy to protect public health and protect the climate. To protect public health, the 2017 Clean Air Plan includes all feasible measures to reduce emissions of O_3 precursors (ROG and NO_x) and reduce O_3 transport to neighboring air basins. In addition, the 2017 Clean Air Plan builds on BAAQMD efforts to reduce $PM_{2.5}$ and TACs. To protect the climate, the 2017 Clean Air Plan defines a vision for transitioning the region to a post-carbon economy needed to achieve ambitious GHG reduction targets for 2030 and 2050 and provides a regional climate protection strategy that will put the San Francisco Bay Area on a pathway to achieve those GHG reduction targets.

BAAQMD establishes and administers a program of rules and regulations to attain and maintain state and national air quality standards and regulations related to TACs. The following BAAQMD rules and regulations may apply to the project:

- **Regulation 2, Rule 1 – Permits.** This rule specifies the requirements for authorities to construct and permits to operate.
- **Regulation 6, Rule 1 – General Requirements.** This rule limits the quantity of particulate matter in the atmosphere through the establishment of limitations on emission rates, concentration, visible emissions, and opacity.
- **Regulation 6, Rule 6 – Prohibition of Trackout.** This rule addresses fugitive road dust emissions associated with trackout of solid materials onto paved public roads outside the boundaries of

large bulk material sites, large construction sites and large disturbed surface sites (sites of 1 acre or more), and large disturbed surface sites.

- **Regulation 8, Rule 1 – General Provisions.** This rule limits the emission of organic compounds into the atmosphere.
- **Regulation 8, Rule 3 – Architectural Coatings.** This rule limits the quantity of volatile organic compounds in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the BAAQMD.
- **Regulation 8, Rule 15 – Emulsified and Liquid Asphalts.** This rule limits the emissions of volatile organic compounds caused by the use of emulsified and liquid asphalt in paving materials and paving and maintenance operations.

City of Menlo Park General Plan

Policies pertaining to improving air quality are addressed in the Circulation and the Open Space and Conservation and the Noise and Safety Elements of the City's General Plan. Relevant General Plan policies related to air quality are included below:

Circulation Element

Goal CIRC-3: Increase mobility options to reduce traffic congestion, GHG emissions, and commute travel time.

Policy CIRC-3.1: Support development and transportation improvements that help reduce per service population (or other efficiency metric) vehicle miles traveled (VMT).

Goal CIRC-4: Improve Menlo Park's overall health, wellness, and quality of life through transportation enhancements.

Policy CIRC-4.1: Encourage the safer and more widespread use of nearly zero-emission modes, such as walking and biking, and lower emission modes like transit, to reduce GHG emissions.

Policy CIRC-4.2: Promote non-motorized transportation to reduce exposure to local air pollution, thereby reducing risks of respiratory diseases, other chronic illnesses, and premature death.

Open Space/Conservation, Noise and Safety Element

Goal OSC 4: Promote Sustainability and Climate Action Planning.

Policy OSC 4.1: Encourage, to the extent feasible, (1) a balance and match between jobs and housing, (2) higher density residential and mixed-use development to be located adjacent to commercial centers and transit corridors, and (3) retail and office areas to be located within walking and biking distance of transit or existing and proposed residential developments.

Policy OSC 4.4: Explore the potential for installing infrastructure for vehicles that use alternative fuel, such as electric plug in charging stations.

Goal OSC 5: 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 OSC 5.1: Continue to apply standards and policies established by the BAAQMD, San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), and City of Menlo Park Climate Action Plan through the CEQA process and other means as applicable.

Regional and Local Air Quality Conditions

San Francisco Bay Area Air Basin Attainment Designation

Pursuant to the 1990 federal Clean Air Act amendments, the EPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether the NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as "attainment" for that pollutant. If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are re-designated as maintenance areas and must have approved maintenance plans to ensure continued attainment of the standards. The California Clean Air Act, like its federal counterpart, called for the designation of areas as "attainment" or "nonattainment," but based on CAAQS rather than the NAAQS. Table 4.2-2 depicts the current attainment status of the project site with respect to the NAAQS and CAAQS.

Table 4.2-2. State and Federal Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	California Standards[a]		National Standards[b]	
		Standard	Attainment Status	Standard	Attainment Status
Ozone (O_3)	1 hour	0.09 ppm	N	NA	NA
	8 hour	0.07 ppm	N	0.070 ppm	N/Marginal[c]
Carbon Monoxide (CO)	1 hour	20 ppm	A	35 ppm	A
	8 hour	9 ppm	A	9 ppm	A
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	A	0.100 ppm	U
	Annual	0.030 ppm	NA	0.053 ppm	A
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	A	0.075 ppm	A
	24 hour	0.04 ppm	A	0.14 ppm	A
	Annual	NA	NA	0.03 ppm	A
Course Particulate Matter (PM_{10})	24 hour	50 μg/m³	N	150 μg/m³	U
	Annual	20 μg/m³	N	NA	NA
Fine Particulate Matter ($PM_{2.5}$)	24 hour	NA	NA	35 μg/m³	N[d]
	Annual	12 μg/m³	N	12 μg/m³	U/A[e]
Sulfates	24 hour	25 μg/m³	A	NA	NA
Lead	30 day	1.5 μg/m³	NA	NA	A
	Cal. Quarter	NA	NA	1.5 μg/m³	A
	Rolling 3-Month Average	NA	NA	0.15 μg/m³	U/A
Hydrogen Sulfide	1 hour	0.03 ppm	U	NA	NA

Table 4.2-2. State and Federal Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	California Standards[a]		National Standards[b]	
		Standard	Attainment Status	Standard	Attainment Status
Visibility-Reducing Particles	8 hour	See Note "f"	U	NA	NA

Source: BAAQMD 2017c; CARB 2020 (state); EPA 2020a (federal).

Notes: ppm = parts per million by volume; N = Nonattainment; NA = Not Applicable (no applicable standard); A = Attainment; μg/m³ = micrograms per cubic meter; U = Unclassified.

[a] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements can be excluded. In particular, measurements are excluded that the CARB determines would occur less than once per year on the average.

[b] National standards shown are the "primary standards" designed to protect public health. National Ambient Air Quality Standards (NAAQS) (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m³ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[c] On October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour ozone concentration per year, averaged over 3 years, is equal to or less than 0.070 ppm. Nonattainment areas will have until 2020 to late 2037 to meet the health standard, with attainment dates varying based on the O_3 level in the area.

[d] On January 9, 2013, the EPA issued a final rule to determine that the San Francisco Bay Area attains the 24-hour $PM_{2.5}$ national standard. This EPA rule suspends key State Implementation Plan requirements as long as monitoring data continues to show that the San Francisco Bay Area attains the standard. Despite this EPA action, the San Francisco Bay Area will continue to be designated as "nonattainment" for the national 24-hour $PM_{2.5}$ standard until such time as the BAAQMD submits a "redesignation request" and a "maintenance plan" to EPA, and EPA approves the proposed redesignation.

[e] In December 2012, the EPA strengthened the annual $PM_{2.5}$ NAAQS from 15.0 to 12.0 μg/m³. In December 2014, EPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated "unclassifiable/attainment" must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard is April 15, 2015.

[f] Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

In summary, the SFBAAB is designated as a nonattainment area for federal and state O_3 and $PM_{2.5}$ standards. The SFBAAB is also designated as a nonattainment area for the state PM_{10} standards. The SFBAAB is designated as "unclassified" or "attainment" for all other criteria air pollutants.

Local Ambient Air Quality

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across the state. BAAQMD operates a network of ambient air monitoring stations throughout San Mateo County, which measure ambient concentrations of pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The BAAQMD monitors air quality conditions at 22 locations throughout the SFBAAB. Due to proximity to the site and similar geographic and climactic characteristics, the Redwood City and San Jose-Jackson Street monitoring station concentrations for all pollutants are considered most representative of the project site. Data for these sites was available for 8-hour O_3, 1-hour O_3, CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ concentrations. Ambient concentrations of pollutants from 2018 through 2020 are presented in Table 4.2-3. The federal and state 8-hour O_3 standards were exceeded in 2019 and 2020, state PM_{10} standard was exceeded in 2018 through 2020, and the federal $PM_{2.5}$ standard was exceeded in 2018 and 2020.

Table 4.2-3. Local Ambient Air Quality Data

Averaging Time	Unit	Agency/ Method	Ambient Air Quality Standard	Measured Concentration by Year			Exceedances by Year		
				2018	2019	2020	2018	2019	2020
Ozone (O_3) – Redwood City									
Maximum 1-hour concentration	ppm	State	0.12	0.067	0.083	0.098	0	0	1
Maximum 8-hour concentration	ppm	State	0.070	0.050	0.077	0.078	0	2	1
		Federal	0.070	0.049	0.077	0.077	0	2	1
Nitrogen Dioxide (NO_2) – Redwood City									
Maximum 1-hour concentration	ppm	State	0.18	0.077	0.054	0.045	0	0	0
		Federal	0.100	0.077	0.055	0.046	0	0	0
Annual concentration	ppm	State	0.030	0.010	0.009	0.008	—	—	—
		Federal	0.053	0.010	0.009	0.008	—	—	—
Carbon Monoxide (CO) – Redwood City									
Maximum 1-hour concentration	ppm	State	20	2.5	2.0	2.1	0	0	0
		Federal	35	2.5	2.0	2.1	0	0	0
Maximum 8-hour concentration	ppm	State	9.0	1.7	1.1	1.5	0	0	0
		Federal	9	1.7	1.0	1.5	0	0	0
Sulfur Dioxide (SO_2) – San Jose – Jackson Street									
Maximum 1-hour concentration	ppm	Federal	0.075	0.069	0.025	0.029	0	0	0
Maximum 24-hour concentration	ppm	Federal	0.14	0.011	0.015	0.008	0	0	0
Annual concentration	ppm	Federal	0.030	0.0021	0.0014	0.0017	—	—	—
Coarse Particulate Matter (PM_{10})[a] – San Jose – Jackson Street									
Maximum 24-hour concentration	μg/m³	State	50	121.8	77.1	137.1	12.2 (4)	11.8 (4)	29.9 (10)
		Federal	150	115.4	75.4	134.9	0.0 (0)	0 (0)	0.0 (0)
Annual concentration	μg/m³	State	20	23.1	19.1	24.8	—	—	—
Fine Particulate Matter ($PM_{2.5}$)[a] – Redwood City									
Maximum 24-hour concentration	μg/m³	Federal	35	120.9	29.5	124.1	13.7 (13)	0.0 (0)	9.3 (9)
Annual concentration	μg/m³	State	12	120.9	29.5	124.1	—	—	—
		Federal	12.0	10.5	7.0	—	—	—	—

Sources: CARB 2021a; EPA 2021b.
Notes: ppm = parts per million by volume; ND = insufficient data available to determine the value; — = not available; μg/m³ = micrograms per cubic meter.

Data taken from CARB iADAM (http://www.CARB.ca.gov/adam) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.
Daily exceedances for particulate matter are estimated days because PM_{10} and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed federal or state standards during the years shown. There is no federal standard for 1-hour ozone, annual PM_{10}, or 24-hour SO_2, nor is there a state 24-hour standard for $PM_{2.5}$.
The Redwood City monitoring station is located at 897 Barron Avenue, Redwood City, California.
The San Jose-Jackson Street monitoring station is located at 158b Jackson Street, San Jose, California.
[a] Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

4.2.3 Thresholds of Significance

The significance criteria used to evaluate the project impacts to air quality are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to air quality would occur if the project would:

A. Conflict with or obstruct implementation of the applicable air quality plan.
B. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
C. Expose sensitive receptors to substantial pollutant concentrations.
D. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.
E. Result in cumulatively considerable air quality impacts.

Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) indicates that, where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to determine whether the Project would have a significant impact on air quality.

Notably, in the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015, the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing environmental conditions might impact a project's occupants, except where the project would significantly exacerbate an existing environmental condition. Accordingly, for each significance criteria above, this analysis considers whether the project would create new impacts or exacerbate existing health risks rather than whether the air quality conditions in the project area would adversely impact the project's workers or residents.

In June 2010, the BAAQMD adopted its updated CEQA Air Quality Guidelines, including new thresholds of significance (BAAQMD 2010), and most recently revised them in May 2017 (BAAQMD 2017a). The guidelines advise lead agencies on how to evaluate potential air quality impacts, including establishing quantitative and qualitative thresholds of significance. These thresholds are based on substantial evidence identified in BAAQMD's Revised Draft Options and Justification Report (BAAQMD 2009) and are summarized in Table 4.2-4.

In general, the BAAQMD significance thresholds for criteria pollutants (ROG, NO_x, PM_{10}, $PM_{2.5}$, and CO) address the first two air quality significance criteria of Appendix G of the CEQA Guidelines (listed above). The BAAQMD maintains that these criteria pollutant thresholds are intended to maintain ambient air quality concentrations below state and federal standards and to prevent a cumulatively considerable contribution to regional nonattainment with ambient air quality standards. The TAC thresholds (cancer and noncancer risks) and local CO thresholds address the third Appendix G significance criterion, and the BAAQMD odors threshold addresses the fourth Appendix G significance criterion.

Table 4.2-4. Thresholds of Significance

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
PM_{10}/$PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
Risks and Hazards (Individual Project)	Compliance with Qualified Community Risk Reduction Plan or Increased cancer risk of >10.0 in 1 million Increased noncancer risk of >1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase >0.3 μg/m^3 annual average Zone of Influence: 1,000-foot radius from property line of source or receptor		
Risks and Hazards (Cumulative)	Compliance with Qualified Community Risk Reduction Plan or Cancer risk of >100 in 1 million (from all local sources) Noncancer risk of >10.0 Hazard Index (chronic, from all local sources) Ambient $PM_{2.5}$ >0.8 μg/m^3 annual average (from all local sources) Zone of Influence: 1,000-foot radius from property line of source or receptor		
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous material located near receptors or new receptors located near stored or used acutely hazardous materials considered significant	
Odors	None	Five confirmed complaints to BAAQMD per year averaged over 3 years	

Source: BAAQMD 2017a.
Notes: lbs/day = pounds per day; tons/year = tons per year; ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; CO = carbon monoxide; ppm = parts per million; μg/m^3 = micrograms per cubic meter; BAAQMD = Bay Area Air Quality Management District.

The BAAQMD established their thresholds of significance for CEQA purposes based on the regional goal to attain the NAAQS and CAAQS. Since an AAQS is based on a conservative estimate of pollutant levels in outdoor air that would protect the public's health, and air district thresholds pertain to attainment of the AAQS, this means that the thresholds established by air districts are also protective of human health.

4.2.4 Impacts and Mitigation Measures

Methodology

Construction Emissions

Emissions from the construction phase of the project were estimated using the California Emissions Estimator Model (CalEEMod) Version 2020.4.0. Construction scenario assumptions, including phasing, equipment mix, and vehicle trips, were based on information provided by the project applicant and CalEEMod default values when project specifics were not known.

For purposes of estimating project emissions, and based on information provided by the project applicant, construction would begin in September 2023 for a duration of 50 months, with buildout in May 2028. The analysis contained herein is based on the following assumptions (duration of phases is approximate):

- Demolition: 13 weeks (September 1, 2023 – December 1, 2023)
- Site Preparation: 6 days (December 1, 2023 – December 10, 2023)
- Grading: 9 weeks (December 11, 2023 – February 11, 2024)
- Building Construction: 3.75 years (September 1, 2024 – May 1, 2028)
- Paving: 2 months (November 1, 2024 – January 1, 2025)
- Architectural Coating: 1.5 years (July 1, 2026 – February 1, 2028)

Construction-worker estimates, vendor and haul truck trips by construction phase were based on information provided by the applicant. Haul truck trips during each grading phase were based on approximate earthwork quantities. Grading for the apartments/townhomes was estimated to involve a total of 5,260 cubic yards of soil import and 32,000 cubic yards of soil export. Construction activities would result in a total of approximately 100 round trips (200 one-way truck trips) for demolition, 1,850 round trips (3,700 one-way truck trips) during grading, and 1,750 round trips (3,850 one-way truck trips) for building construction. CalEEMod default trip length values were used for the distances for worker and vendor trips; however, haul trips from demolition and grading activities was increased to 25 miles per one-way trip per applicant input. Fugitive dust generated during truck loading is included in CalEEMod as an on-site source of fugitive dust emissions and is calculated based on estimated throughput of loaded and unloaded material.

The construction equipment mix and vehicle trips used for estimating the project-generated construction emissions are shown in Table 4.2-5. For the analysis, it was generally assumed that heavy construction equipment would be operating at the site 5 days per week (22 days per month) during project construction.

Table 4.2-5. Construction Scenario Assumptions

Construction Phase	One-Way Vehicle Trips			Equipment		
	Average Daily Workers Trips	Average Daily Vendor Truck Trips	Total Haul Truck Trips	Type	Quantity	Usage Hours
Demolition	8	3	200	Excavators	2	8
				Loaders (Tractors/Loaders/ Backhoes)	2	8
				Bobcats (Skid Steer Loaders)	4	8
				Backhoes (Tractors/Loaders/ Backhoes)	1	8
Site Preparation	6	3	0	Scrapers	2	8
				Graders	2	8
				Water Trucks (Off-Highway Trucks)	2	8
				Compactors (Plate Compactors)	2	8
Grading	8	3	3,700	Scrapers	2	8
				Graders	2	8
				Water Trucks (Off-Highway Trucks)	1	8
				Compactors (Plate Compactors)	2	8
Building Construction	120	20	3,500	Excavators	2	8
				Loaders (Tractors/Loaders/ Backhoes)	2	8
				Forklifts	4	8
				Backhoes (Tractors/Loaders/ Backhoes)	4	8
Paving	0	0	0	Pavers	5	8
				Paving Equipment	1	8
				Rollers	1	8

Table 4.2-5. Construction Scenario Assumptions

Construction Phase	One-Way Vehicle Trips			Equipment		
	Average Daily Workers Trips	Average Daily Vendor Truck Trips	Total Haul Truck Trips	Type	Quantity	Usage Hours
Architectural Coating	50	5	0	Paint Sprayers (Other Construction Equipment)	6	8
				Stucco Rigs (Other Construction Equipment)	4	8
				Forklifts	4	8
				Air Compressors	48	8

Source: Appendix C1.
Notes: Equipment types noted in parenthesis represent the equipment equivalent used in CalEEMod construction modeling.

Operational Emissions

Emissions from the operational phase of the project were estimated using CalEEMod Version 2020.4.0. Year 2028 was assumed as the first full year of operations after completion of construction.

Area Sources

CalEEMod was used to estimate operational emissions from area sources, including emissions from consumer product use, architectural coatings, and landscape maintenance equipment.

Consumer products are chemically formulated products used by household and institutional consumers, including detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products. Other paint products, furniture coatings, or architectural coatings are not considered consumer products (CAPCOA 2021). Consumer product ROG emissions are estimated in CalEEMod based on the floor area of residential buildings and on the default factor of pounds of ROG per building square foot per day. For parking lot land uses, CalEEMod estimates ROG emissions associated with use of parking surface degreasers based on a square footage of parking surface area and pounds of ROG per square foot per day.

ROG off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers used during building maintenance. CalEEMod calculates the ROG evaporative emissions from application of residential surface coatings based on the ROG emission factor, the building square footage, the assumed fraction of surface area, and the reapplication rate. The model default reapplication rate of 10 percent of area per year is assumed. Consistent with CalEEMod defaults, it is assumed that the residential surface area for painting equals 2.7 times the floor square footage with 75 percent assumed for interior coating and 25 percent assumed for exterior surface coating. For the surface parking, the architectural coating area is assumed to be 6 percent of the total square footage, consistent with the supporting CalEEMod studies provided as an appendix to the CalEEMod User's Guide (CAPCOA 2021).

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers. The emissions associated from landscape equipment use are estimated based on CalEEMod default values for emission factors (grams per residential dwelling unit per day and grams per square foot of nonresidential building space per day) and number of summer days (when landscape maintenance would generally be performed) and winter days. For San Mateo County, the average annual operational days for landscape equipment are estimated at 180 days per year (CAPCOA 2021). As noted in Section 4.2.2, in December 2021, CARB approved proposed amendments to the SORE Regulations, which requires landscaping equipment to be zero emission starting in 2024.

Energy Sources

As represented in CalEEMod, energy sources include emissions associated with building electricity and natural gas usage. Notably, only the existing buildings include emissions from natural gas usage. Furthermore, the project would be built in accordance with the City's Municipal Code Chapter 12.16, approved September 2019, which requires new residential buildings, with exceptions that do not apply here, to be "all-electric," i.e., built without a natural gas pipeline connection. Electricity use would contribute indirectly to criteria air pollutant emissions; however, the emissions from electricity use are only quantified for GHG emissions in CalEEMod, since criteria pollutant emissions occur at the site of the power plant, which is typically off site.

Mobile Sources

Mobile sources for the project would primarily be motor vehicles (automobiles and light-duty trucks) traveling to and from the project site. Motor vehicles may be fueled with gasoline, diesel, or alternative fuels. Regulatory measures related to mobile sources include AB 1493 (Pavley), ACC Standards, and related federal standards. AB 1493 required that CARB establish GHG emission standards for automobiles, light-duty trucks, and other vehicles determined by CARB to be vehicles that are primarily used for noncommercial personal transportation in the state. The ACC I program is an emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package of regulations. Although not currently included in EMFAC's emission factor estimates and forecasts, in August 2022, CARB adopted the ACC II regulations which would rapidly scale down light-duty passenger car, truck and SUV emissions starting with the 2026 model year through 2035, with all new passenger cars, trucks and SUVs sold in California to be zero emissions by 2035.

The anticipated trip generation, including the trip rates and total trips, are based on the project's transportation analysis. Specifically, the project would generate 1,774 trips per day while the existing land uses currently generate approximately 904 trips per day. CalEEMod default data, including temperature, trip characteristics, variable start information, emissions factors, were conservatively used for the model inputs to estimate daily emissions from proposed vehicular sources. Project-related traffic was assumed to include a mixture of vehicles in accordance with the model outputs for traffic. Emission factors representing the vehicle mix and emissions for 2028 were used to estimate emissions associated with full buildout of the project. For existing land uses, emission factors representing the vehicle mix and emissions for 2020 were used to estimate emissions.

Emergency Generator

An emergency, or stand-by, generator is anticipated to be required for the project in event of a power outage. While use of generators during an emergency is not included in the emissions inventory as they are speculative, emissions associated with testing and maintenance of the generators is included. Based on information provided by the applicant, the project would include a 300-kilowatt or 464-brake horsepower emergency generator. The emergency generator would be diesel-fueled and would be used for non-emergency operation up to 50 hours per year (for routine testing and maintenance). CalEEMod was used to estimate emissions from emergency generator testing and maintenance.

Construction Health Risk Assessment

The greatest potential for TAC emissions during project construction would be DPM emissions from heavy equipment operations and heavy-duty trucks. As a precautionary measure, a HRA was performed to assess the impact of construction on sensitive receptors proximate to the project Site. A construction HRA was performed to evaluate the potential impact to existing offsite receptors as a result of construction of the project. For risk assessment purposes, PM_{10} in diesel exhaust is considered a proxy for DPM.[3] Notably, complete model results for the construction HRA are included as Appendix C2

The construction HRA applies the methodologies prescribed in the OEHHA document, Air Toxics Hot Spots Program Risk Assessment Guidelines – Guidance Manual for Preparation of Health Risk Assessments (OEHHA Guidelines) (OEHHA 2015). Cancer risk parameters, such as age-sensitivity factors, daily breathing rates, exposure period, fraction of time at home, and cancer potency factors were based on the values and data recommended by OEHHA are implemented in Hotspots Analysis and Reporting Program Version 2 (HARP2), which was used to estimate risk from construction activities.

For short-term construction, a dispersion modeling analysis was conducted of DPM emitted from diesel vehicles and construction equipment on the proposed project site for the HRA to assess the health risk impacts of the project's construction on proximate off-site sensitive receptors. Additionally, a separate dispersion modeling analysis was conducted of TACs emitted by the natural gas emergency generators to be located at the project. The dispersion modeling was performed using the AERMOD Version 21112, which is the model EPA approved and BAAQMD recommends for atmospheric dispersion of emissions. AERMOD is a steady-state Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of surface and elevated sources, building downwash, and simple and complex terrain. Principal parameters of AERMOD for the project included the following:

- **Dispersion Model:** The air dispersion model used was AERMOD, Version 21112, with the Lakes Environmental Software implementation/user interface, AERMOD View, Version 10.2.1. Under the construction scenario, a unit emission rate (1 gram per second [g/s]) was normalized over the line of adjacent volume sources for the AERMOD run to obtain the "X/Q" values. Under the operational scenario, AERMOD was run with each source emitting unit emissions (1 g/s) to obtain the "X/Q" values. X/Q is a dispersion factor that is the average effluent concentration normalized by source strength, and is used as a way to simplify the representation of emissions from many sources. The maximum concentrations were determined for the 1-hour and Period averaging periods.
- **Meteorological Data:** The latest 5-year meteorological data (years 2011-2015) for the San Carlos Airport station (KSQL) were provided by BAAQMD, and then input to AERMOD.
- **Urban and Rural Options:** Typically, urban areas have more surface roughness and structures and low-albedo surfaces that absorb more sunlight, and thus, more heat, relative to rural areas. The urban

3 Under California regulatory guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole. CalEPA is a proponent of using the surrogate approach to quantifying cancer risks associated with diesel exhaust over a component-based approach, which involves estimating risks for each of the individual components of a mixture. CalEPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated components" (OEHHA 2003).

dispersion option was selected and the San Mateo County population for year 2020 (764,442 persons) input into AERMOD.

- **Terrain Characteristics:** Digital elevation model files were imported into AERMOD so that complex terrain features were evaluated as appropriate. The National Elevation Dataset (NED) dataset with resolution of 1/3 arc-second was used.
- **Sensitive Receptors:** This HRA evaluates the risk to existing residential receptors located in proximity to the project. A uniform fine 1-kilometer by 1-kilometer Cartesian grid with 20-meter spacing was centered over the project site and converted into discrete receptors to capture the maximum risk.
- **Source Release Construction Scenario:** Air dispersion modeling of DPM emissions was conducted assuming the equipment would operate in accordance with the modeling scenario estimated in CalEEMod. The construction equipment DPM emissions were modeled as a line of adjacent volume sources across the project site to represent project construction with a release height of 5 meters, plume height of 2.33 meters, and plume width of 11.63 meters. Construction equipment would operate up to 8 hours per day.

Plot files generated in AERMOD were then imported into CARB's HARP2, with ground level concentrations determined by multiplication of emission rates and X/Q values for each individual source of emissions. HARP2 then assessed resulting cancer and noncancer risk at the existing receptors from exposure to TAC emissions, in accordance with the OEHHA's *Air Toxics Hot Spots Program Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments 2015* (2015 Risk Assessment Guidelines Manual; OEHHA 2015).

Informational Roadway Health Risk Assessment

The project is located adjacent to the Bayshore Freeway (Highway 101), Bayfront Expressway (Highway 84), Marsh Road, and Chrysler Drive, which all have over 10,000 average daily traffic. As such, for informational purposes, a HRA analysis was prepared to estimate health risk impacts from roadway DPM and total organic gases (TOG) emissions at future residents of the project.

The project's operational year of 2028 was assumed as the starting year for the HRA's 30-year exposure for residents on project site. Assuming an earlier year results in a more conservative analysis as vehicle emission factors and the percent of diesel vehicles on the roadway generally decreases over time due to more stringent vehicle standards, as well as fleet turnover replacing older vehicles in later years.

The HRA includes exposure to TAC emissions from diesel vehicles traveling on Highways 101 and 84, Marsh Road, and Chrysler Drive. For risk assessment purposes, particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$) in diesel exhaust originating from diesel vehicles traveling on Highways 101 and 84, Marsh Road, and Chrysler Drive is considered DPM. As explained previously, diesel exhaust, which a complex mixture of gases and fine particles emitted by diesel-fueled combustion engines (CalEPA 1998), is identified by the State of California as a known carcinogen. Under California regulatory guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole. CalEPA is a proponent of using the surrogate approach to quantifying cancer risks associated with diesel exhaust over a component-based approach, which involves estimating risks for each of the individual components of a mixture. CalEPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated components" (OEHHA 2003).

The project would be required to comply with the Building Code applicable when construction permit applications are submitted (likely the 2022 Building Code, which takes effect on January 1, 2023). In general, later building codes are more stringent than earlier building codes. The 2019 Building Code requires installation of Minimum Efficiency Reporting Value 13 (MERV 13) air filtration systems on return vents in the proposed residential units. EPA reported that the MERV 13 filters remove 80 percent to 90 percent of particles ranging from 1 to 10 microns (EPA 2020b). Accordingly, this HRA assumes an 80 percent particulate matter reduction from MERV 13 filters. Additionally, to account for exposure of DPM and $PM_{2.5}$ inside and outside the residence, the emissions incorporated an 87 percent time spent inside factor, which accounts for the amount of time that particulate exposure would be reduced by the MERV 13 filters. This HRA incorporates time spent indoors and the time spent away from home as recommended by OEHHA (OEHHA 2015). Accounting for the actual time spent indoors and exposure related to the residents within the project provides a more realistic exposure scenario from particulate emissions from Highways 101 and 84, Marsh Road, and Chrysler Drive. Detailed emissions data are provided in Appendix C2.

Per the BAAQMD *Recommended Methods for Screening and Modeling Local Risks and Hazards* (BAAQMD 2011), the TACs included in this HRA are DPM and total organic gases (TOG, both exhaust and evaporative) from on-road vehicles. DPM and TOG emission factors were calculated using the latest version of CARB's mobile source emission inventory, EMFAC2021. Exhaust particulate matter emissions with a diameter less than or equal to 2.5 microns ($PM_{2.5}$) from diesel-fueled vehicles were used as a proxy for DPM (BAAQMD 2011). To estimate the emissions from vehicles traveling on Highways 101 and 84, Marsh Road, and Chrysler Drive, EMFAC2021 was run for all vehicle classes in San Mateo County. EMFAC2021 can generate emission factors (also referred to as emission rates) in grams per mile for the fleet in a class of motor vehicles within a region for a particular geographical study year. For this analysis, San Mateo County and calendar year 2028 were selected.

A vehicle miles traveled weighted average emission factor was estimated for trucks (LHDT1, LHDT2, MHDT, and HHDT) and non-trucks (LDA, LDT1, LDT2, MDV, MH, OBUS, SBUS, UBUS, and MCY). The amount of vehicle traffic present on the roadway segments evaluated in this HRA is measured in terms of vehicle miles traveled per segment. This was calculated by taking the average daily traffic and multiplying it by the distance of the roadway segment evaluated. The total emissions of DPM and TOG (in pounds per hour and pounds per year) were then calculated for each roadway segment by multiplying the emission factor and the vehicle miles traveled. Notably, in addition to exhaust $PM_{2.5}$ (which is used as a surrogate for DPM), non-TAC $PM_{2.5}$ emissions associated with tire-wear and brake-wear were included in the emissions inventory to estimate total $PM_{2.5}$ concentrations. The calculated emissions of DPM, TOG, and $PM_{2.5}$ and speciation profiles for TOG, used to determine the emissions of gaseous TACs (BAAQMD 2011), which are included in Appendix C2.

A dispersion modeling analysis was conducted of DPM emitted from diesel vehicles on the project site for the HRA to assess the health risk impacts of the existing vehicles on future onsite sensitive receptors. The dispersion modeling was performed using the AERMOD. AERMOD is a steady-state Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of surface and elevated sources, building downwash, and simple and complex terrain. Principal parameters of this modeling are presented below.

- **Dispersion Model:** The air dispersion model used was AERMOD, Version 21112, with the Lakes Environmental Software implementation/user interface, AERMOD View, Version 10.2.1. A unit emission rate (1 gram per second (g/s)) was normalized over the line of adjacent volume sources and area sources for the AERMOD run to obtain the "X/Q" values. X/Q is a dispersion factor that is the average effluent concentration normalized by source strength, and is used as a way to simplify the representation of emissions from many sources. The maximum concentrations were determined for the 1-hour and Period averaging periods.

- **Meteorological Data:** The latest 5-year meteorological data (years 2011-2015) for the San Carlos Airport station (KSQL) were provided by BAAQMD, and then input to AERMOD.
- **Urban and Rural Options:** Typically, urban areas have more surface roughness and structures and low-albedo surfaces that absorb more sunlight, and thus, more heat, relative to rural areas. The urban dispersion option was selected and the San Mateo County population for year 2020 (764,442 persons) input into AERMOD.
- **Terrain Characteristics:** Digital elevation model files were imported into AERMOD so that complex terrain features were evaluated as appropriate. The National Elevation Dataset (NED) dataset with resolution of 1/3 arc-second was used.
- **Sensitive Receptors:** This HRA evaluates the risk to existing residential receptors located in proximity to the project. A uniform fine 1-kilometer by 1-kilometer Cartesian grid with 20-meter spacing was centered over the project site and converted into discrete receptors to capture the maximum risk.
- **Source Release Construction Scenario:** Vehicles traveling on the Bayfront Expressway (Highway 84), Bayshore Freeway (Highway 101), Marsh Road, and Chrysler Drive were modeled as a line of adjacent volume sources for the freeway segment nearby the project site. The length of each line volume source was based on the modeled length in AERMOD. The AERMOD-modeled roadway segments total up to 518 meters. Trucks and non-trucks were modeled as separate line volume sources to account for different plume and release characteristics resulting in a total of eight separate line volume sources. Plume height was assumed to be 6.1 meters for trucks and 0.91 meters for non-trucks (BAAQMD 2011). A release height was estimated for each source assuming 1/2 of the plume height, which equals 3.05 meters for trucks and 0.46 meters for non-trucks (BAAQMD 2011). The plume width was estimated for each segment based on the width of the traveling lanes plus 6 meters (or approximately 3 meters on each side) to account for vehicle wake (EPA 2021c).

Dispersion model plot files from AERMOD were then imported into CARB's HARP2 to determine health risk, which requires peak one-hour emission rates and annual emission rates for all pollutants for each modeling source. OEHHA recommends that an exposure duration (residency time) of 30 years be used to estimate individual cancer risk for the maximally exposed individual resident (MEIR) starting in the third trimester of pregnancy to accommodate the increased susceptibility of exposures in early life (OEHHA 2015).

Project Impacts

Impact 4.2-1 Would the project conflict with or obstruct implementation of the applicable air quality plan?

An area is designated as "in attainment" when it is in compliance with the federal and/or state standards. These standards are set by the EPA or CARB for the maximum level of a given air pollutant that can exist in the outdoor air without unacceptable effects on human health or public welfare with a margin of safety. The project site is located within the SFBAAB, which is designated non-attainment for the federal 8-hour O_3 and 24-hour $PM_{2.5}$ standards. The area is in attainment or unclassified for all other federal standards. The area is designated non-attainment for state standards for 1-hour and 8-hour O_3, 24-hour PM_{10}, annual PM_{10}, and annual $PM_{2.5}$.

On April 19, 2017, the BAAQMD adopted the *Spare the Air: Cool The Climate - Final 2017 Clean Air Plan* (BAAQMD 2017b). The BAAQMD *CEQA Air Quality Guidelines* identify a three-step methodology for determining a project's consistency with the current Clean Air Plan. If the responses to these three questions can be concluded in the affirmative and those conclusions are supported by substantial evidence, then the BAAQMD considers the project to be consistent with air quality plans prepared for the Bay Area. The three questions are:

1. Does the project support the goals of the Air Quality Plan?
2. Does the project include applicable control measures from the Clean Air Plan?
3. Does the project disrupt or hinder implementation of any control measures from the Clean Air Plan?

The first question to be assessed in this methodology is "does the project support the goals of the Air Quality Plan"? The BAAQMD-recommended measure for determining project support for these goals is consistency with BAAQMD thresholds of significance. If a project would not result in significant and unavoidable air quality impacts, after the application of all feasible mitigation measures, the project would be consistent with the goals of the *2017 Clean Air Plan*. As indicated in the following discussion with regard to Threshold AQ-2 below, the project would result in less than significant construction and operational emissions and would not result in long-term adverse air quality impacts. Therefore, the project would be considered to support the primary goals and be consistent with the BAAQMD current Clean Air Plan.

The second question to be assessed is "does the project include applicable control measures from the Clean Air Plan?" The *2017 Clean Air Plan* contains 85 control measures aimed at reducing air pollution in the Bay Area. Projects that incorporate all feasible and applicable air quality plan control measures are considered consistent with the Clean Air Plan. The control strategies of the *2017 Clean Air Plan* include measures in the categories of stationary sources, the transportation sector, the buildings sector, the energy sector, the agriculture sector, natural and working lands, the waste sector, the water sector, and super-GHG measures. Depending on the control measure, the tools for implementation include leveraging the BAAQMD rules and permitting authority, regional coordination and funding, working with local governments to facilitate best policies in building codes, outreach and education, and advocacy strategies. The project site is designated as Mixed-Use Residential on the ConnectMenlo land use designation map and is within the City's Residential Mixed-Use Bonus (R-MU-B) zoning district. The project proposes to develop 116 for-sale townhomes and 316 rental apartments, consistent with these designations. As detailed in Chapter 3, Project Description, the project includes multiple improvements and site-related features that would result in a reduction in vehicle trips and associated emissions, including: participation in a local Transportation Management Association (TMA) that provides documented, ongoing support for alternative commute programs; public and/or private bike share program; car share membership for employees and residents; and access to and from the nearby SamTrans transit stations. The project also would also include various sustainability features including: installation of rooftop photovoltaic energy generation panels, EV charging, ultra-low-flow plumbing fixtures, water-efficient landscaping, and pedestrian and bicycle facilities. In addition, the project would construct all-electric residential buildings per the City's Municipal Code Chapter 12.16. Since the project would comply with all applicable BAAQMD rules and would meet or exceed state and federal standards and/or local building codes, the project would not conflict with any applicable control measures from the *2017 Clean Air Plan*.

The third question to be assessed in this consistency methodology is "does the project disrupt or hinder implementation of any control measures from the Clean Air Plan?" Examples of how a project may cause the disruption or delay of control measures include a project that precludes an extension of a transit line or bike path, or proposes excessive parking beyond parking requirements. The project would not create any barriers or impediments to planned or future improvements to transit or bicycle facilities in the area, nor would it include excessive parking. Therefore, the project would not hinder implementation of *2017 Clean Air Plan* control measures.

In summary, the responses to all three of the questions with regard to Clean Air Plan consistency are affirmative and the project would not conflict with or obstruct implementation of the Clean Air Plan. This is a **less-than-significant** impact.

Mitigation Measures

No mitigation measures are required.

Impact 4.2-2 Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

Air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and the BAAQMD develops and implements plans for future attainment of ambient air quality standards. Based on these considerations, project-level thresholds of significance for criteria pollutants are used in the determination of whether a project's individual emissions would have a cumulatively considerable contribution on air quality. Appendix G of the CEQA Guidelines indicates that, where available, the significance criteria established by the applicable air district may be relied upon to determine whether a project would have a significant impact on air quality. The BAAQMD has established Air Quality Significance Thresholds which set forth quantitative emissions significance thresholds below which a project would not have a significant impact on ambient air quality (BAAQMD 2017a). If a project's emissions would exceed the BAAQMD significance thresholds, it would be considered to have a cumulatively considerable contribution to cumulative air quality impacts. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant (BAAQMD 2017a).

A quantitative analysis was conducted to determine whether project would result in a cumulatively considerable net increase in emissions of criteria air pollutants for which the SFBAAB is designated as nonattainment under the NAAQS or CAAQS. As discussed above, the SFBAAB is designated as nonattainment for ozone and particulate matter. The BAAQMD has thresholds for particulate matter but not ozone. Ozone is created primarily through the atmospheric combination of NO_x and ROG. For this reason, the BAAQMD thresholds for NOx and ROG act as a proxy for measuring a project's impact on ozone.

The quantitative air quality analysis of project-generated emissions associated with construction and operation presented in the following discussion applies the BAAQMD thresholds to determine the potential for the project to result in a cumulatively considerable contribution to significant impacts under CEQA. The BAAQMD significance thresholds for construction are as follows: 54 pounds per day for ROG, 54 pounds per day for NO_x, 82 pounds per day for PM_{10} exhaust, and 54 pounds per day for $PM_{2.5}$ exhaust. The BAAQMD significance thresholds for operations are as follows: 54 pounds per day for ROG or 10 tons per year, 54 pounds per day for NO_x or 10 tons per year, 82 pounds per day for PM_{10} or 15 tons per year, and 54 pounds per day for $PM_{2.5}$ or 10 tons per year.

Construction Emissions

Proposed construction activities would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment and soil disturbance) and off-site sources (i.e., on-road delivery trucks, and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity; the specific type of operation; and, for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts.

Average daily emissions were computed by dividing the total construction emissions by the number of active construction days, which were then compared to the BAAQMD construction thresholds of significance. Table 4.2-6 shows average daily construction emissions of O_3 precursors (ROG and NO_x), PM_{10} exhaust, and $PM_{2.5}$ exhaust during project construction.[4] Details of the emission calculations are provided in Appendix C1.

Table 4.2-6. Average Daily Unmitigated Construction Emissions

Year	ROG	NO_x	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
	Pounds per day			
2023-2028	9.3	47.4	2.1	2.0
BAAQMD Construction Thresholds	*54*	*54*	*82*	*54*
Threshold exceeded?	No	No	No	No

Source: Appendix C1.
Notes: ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter.
The values shown are average daily emissions based on total overall tons of construction emissions, converted to pounds, and divided by 1,072 active work days.

As shown in Table 4.2-6, construction of the project would not exceed BAAQMD significance thresholds. However, the BAAQMD does not have a quantitative significance threshold for fugitive dust. Instead, the BAAQMD's CEQA Air Quality Guidelines recommend that projects determine the significance for fugitive dust through application of best management practices (BMPs). Pursuant to ConnectMenlo Mitigation Measure AQ-2b1, the City requires all "applicants for future development projects to comply with the current Bay Area Air Quality Management District's basic control measures for reducing construction emissions of PM_{10} (Table 8-1, Basic Construction Mitigation Measures Recommended for All Proposed Projects, of the BAAQMD CEQA Guidelines)." The project would comply with this City requirement by implementing MM 4.2a, which contains the BAAQMD recommended BMPs. Implementation of the required fugitive dust mitigation would ensure air quality and fugitive dust-related impacts associated with construction would remain **less than cumulatively considerable** and that the projects impact on all criteria air pollutants during construction would be **less than cumulatively considerable.**

Operational Emissions

Operation of the project would generate criteria pollutant (including ROG, NO_x, PM_{10}, and $PM_{2.5}$) emissions from mobile sources (vehicular traffic), area sources (consumer products, landscaping equipment), and energy sources (electrical consumption). The criteria pollutant emissions associated with the existing land uses within the site were also quantified using CalEEMod. CalEEMod default values were used to estimate emissions from area and energy sources for both the project and the existing land uses where project-specific information was not available.

4 Fuel combustion during construction and operation would also result in the generation of sulfur dioxide (SO_2) and CO. These values are included in Appendix C1. However, since the SFBAAB is in attainment of these pollutants, the BAAQMD has not established a quantitative mass-significance threshold for comparison and are not included in the project-generated emissions tables in this document. Notably, the BAAQMD does have screening criteria for operational localized CO.

Table 4.2-7 summarizes the net change in operational emissions from the daily mobile, energy, and area emissions of criteria pollutants that would be generated from the project and the existing land uses which are compared to the BAAQMD operational thresholds. Complete details of the emissions calculations are provided in Appendix C1.

Table 4.2-7. Maximum Daily Unmitigated Operational Emissions

Emission Source	ROG	NO_x	PM_{10}	$PM_{2.5}$
	Pounds per day			
Proposed Project				
Area	13.38	0.41	0.20	0.20
Energy	0.00	0.00	0.00	0.00
Mobile	5.16	4.44	12.18	3.28
Emergency Generator	0.76	2.13	0.11	0.11
Total	**19.30**	**6.98**	**12.49**	**3.59**
Existing Land Uses				
Area	2.52	<0.01	<0.01	<0.01
Energy	0.08	0.75	0.06	0.06
Mobile	2.71	3.27	5.37	1.46
Total	**5.31**	**4.02**	**5.43**	**1.52**
Net Change in Emissions				
Net Change (Project – Existing Land Uses)	13.99	2.96	7.06	2.07
BAAQMD Operational Thresholds	*54*	*54*	*82*	*54*
Threshold exceeded?	**No**	**No**	**No**	**No**

Source: Appendix C1.
Notes: ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; BAAQMD = Bay Area Air Quality Management District; <0.01 = value less than reported 0.01.
The values shown are the maximum summer or winter daily emissions results from CalEEMod.

As indicated in Table 4.2-7, project-related operational emissions of ROG, NO_x, PM_{10}, and $PM_{2.5}$ would not exceed the BAAQMD significance thresholds, and thus, project operations would have a **less than cumulatively considerable** impact on emissions in the air basin.

Regarding localized CO concentrations, according to the BAAQMD thresholds, a project would result in a less than significant impact if the following screening criteria are met:

1. 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.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. 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).

As identified in Section 4.14, Transportation, and the Transportation Impacts Analysis provided in Appendix J, the proposed project would generate a net increase of 870 daily traffic trips. The project would not result in new traffic trips that would exceed the BAAQMD screening criteria (numbers 2 and 3 above) and, as discussed in Section 4.14, Transportation, of this EIR, is consistent with the applicable congestion management program. Accordingly, project-related traffic would not exceed CO standards and therefore, no further analysis was conducted for CO impacts. This CO emissions impact would be considered **less than significant** on a project-level and **less than cumulatively considerable** on a cumulative basis.

Health Effects of Criteria Air Pollutants

Construction and operational emissions of the project would not exceed the BAAQMD emission thresholds for any criteria air pollutants, including ROG, NO_x, PM_{10}, and $PM_{2.5}$; the BAAQMD thresholds are protective of human health.

Health effects associated with O_3 include respiratory symptoms, worsening of lung disease leading to premature death, and damage to lung tissue (CARB 2019c). ROG and NO_x are precursors to O_3, for which the SFBAAB is designated as nonattainment with respect to the NAAQS and CAAQS. The contribution of ROG and NO_x to regional ambient O_3 concentrations is the result of complex photochemistry. The increases in O_3 concentrations in the SFBAAB due to O_3 precursor emissions tend to be found downwind of the source location because of the time required for the photochemical reactions to occur. Further, the potential for exacerbating excessive O_3 concentrations would also depend on the time of year that the ROG emissions would occur, because exceedances of the O_3 NAAQS and CAAQS tend to occur between April and October when solar radiation is highest. Due to the lack of quantitative methods to assess this complex photochemistry and the difficulty in connecting small amounts of pollution to generalized health outcomes, the holistic effect of a single project's emissions of O_3 precursors on health impacts is hard to predict. That being said, because the project would not exceed the BAAQMD emission thresholds, the project would not make a cumulatively considerable contribution to adverse health effects associated with O_3. Additionally, the project would use architectural coatings that adhere to Regulation 8, Rule 3 – Architectural Coatings, which restricts the content of volatiles in coatings. This would ensure that ROG emissions are minimized.

Health effects associated with NO_x include lung irritation and enhanced allergic responses (CARB 2019c). Because project-related NO_x emissions would not exceed the BAAQMD emission threshold, and because the SFBAAB is a designated attainment area for NO_2 (and NO_2 is a constituent of NO_x) and the existing NO_2 concentrations in the area are well below the NAAQS and CAAQS standards, it is not anticipated that the project would cause an exceedance of the NAAQS and CAAQS for NO_2 or result in potential health effects associated with NO_2 and NO_x.

Health effects associated with CO include chest pain in patients with heart disease, headache, light-headedness, and reduced mental alertness (CARB 2019d). CO tends to be a localized impact associated with congested intersections. As described previously, the project would result in minimal new traffic trips and would not exceed the BAAQMD CO screening criteria resulting in the formation of potential CO hotspots. Thus, the project's CO emissions would not contribute to significant health effects associated with this pollutant.

Health effects associated with PM_{10} include premature death and hospitalization, primarily for worsening of respiratory disease (CARB 2022). Construction and operation of the project would also not exceed thresholds for PM_{10} or $PM_{2.5}$ and would not contribute to exceedances of the NAAQS and CAAQS for particulate matter or obstruct the SFBAAB from coming into attainment for these pollutants. Additionally, the project would implement dust control strategies and be required to comply with BAAQMD's Regulation 6, Rule 1 – Particulate Matter to limit the amount of fugitive dust generated during construction. Due to the minimal contribution of PM_{10} and $PM_{2.5}$ during construction and operation, it is not anticipated that the project would result in potential health effects related to particulate matter.

In summary, because construction and/or operation of the project would not exceed the BAAQMD significance thresholds for ROG, NO_x, PM_{10}, and $PM_{2.5}$, and because the BAAQMD thresholds are based on levels that the SFBAAB can accommodate without affecting the attainment date for the AAQS and the AAQS are established to protect public health and welfare, the project would result in **less than significant** health effects associated with criteria air pollutants.

Mitigation Measures

MM 4.2a has been evaluated for feasibility and incorporated to reduce potentially significant impacts related to fugitive dust during construction of the project.

MM 4.2a Fugitive Dust Reductions, the project shall implement the following during construction:

1. All exposed surfaces (e.g., parking/staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off site shall be covered.
3. All visible mud or dirt track-out onto local roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
5. 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.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Impact 4.2-3 Would the project expose sensitive receptors to substantial pollutant concentrations?

Toxic Air Contaminants

Health Impacts of Construction Toxic Air Contaminants

When evaluating whether a project would expose sensitive receptors to substantial pollutant concentrations, the analysis focuses on whether emissions would be high enough to have substantial health effects on such receptors. The health effects from criteria air pollutants are addressed above. TACs also have health impacts, including increasing the risk of having cancer and other illnesses. "Incremental cancer risk" is the net increased likelihood that a person continuously exposed to concentrations of TACs resulting from a project over a 9-year, 30-year, and 70-year exposure period would contract cancer based on the use of standard OEHHA risk assessment methodology (OEHHA 2015). In addition, some TACs have non-carcinogenic effects. TACs that would potentially be emitted during construction activities would be DPM emitted from heavy-duty construction equipment and heavy-duty trucks. Heavy-duty construction equipment and diesel trucks are subject to CARB ATCMs to reduce DPM emissions. According to the OEHHA, HRAs should be based on a 30-year exposure duration based on typical residency period; however, such assessments should be limited to the period/duration of activities associated with the project (OEHHA 2015). The results of the HRA for project construction is summarized in Table 4.2-8.

Table 4.2-8. Summary of Maximum Cancer and Chronic Health Risks - Unmitigated

Impact Analysis	Impact Parameter	Units	Project Impact	CEQA Threshold	Level of Significance
Maximally Exposed Individual Resident					
Construction HRA	Cancer Risk	Per Million	13.67	10	**Potentially Significant**
	Chronic Hazard Index	Index Value	0.04	1.0	Less than Significant
	$PM_{2.5}$ Concentration (µg/m³)	µg/m³	0.19	0.3	Less than Significant

Source: Appendix C2.
Notes: CEQA = California Environmental Quality Act; HRA = Health Risk Assessment

As shown in Table 4.2-8, the results of the HRA demonstrate that the TAC exposure from construction diesel exhaust emissions would result in an on-site cancer risk above the 10 in 1 million threshold for the project. The Chronic Hazard Index for the project would be less than one and the maximum $PM_{2.5}$ concentration would be 0.19 µg/m³. Therefore, TAC emissions from construction activities associated with the project may expose sensitive receptors to substantial pollutant concentrations of TACs and would result in a potentially significant impact; therefore, implementation of MM 4.2b is required. MM 4.2b, which requires the use of Tier 4 Final engines on construction equipment, shall be implemented to reduce DPM during project construction

The detailed emissions assumptions and model outputs using CalEEMod are provided in Appendix C2. Table 4.2-9 shows the results of the HRA after implementation of MM 4.2b.

Table 4.2-9. Summary of Maximum Cancer and Chronic Health Risks - Mitigated

Impact Analysis	Impact Parameter	Units	Project Impact	CEQA Threshold	Level of Significance
Maximally Exposed Individual Resident					
Construction HRA	Cancer Risk	Per Million	9.21	10	Less than Significant
	Chronic Hazard Index	Index Value	0.03	1.0	Less than Significant
	$PM_{2.5}$ Concentration (µg/m³)	µg/m³	0.13	0.3	Less than Significant

Source: Appendix C2.
Notes: CEQA = California Environmental Quality Act; HRA = Health Risk Assessment

As shown in Table 4.2-9, the HRA results from the mitigated scenario show cancer risks less than the 10 in 1 million threshold, the chronic hazard index less than the 1.0 threshold and the maximum $PM_{2.5}$ concentration would be 0.13 μg/m³. Impacts would be **less than significant** with mitigation incorporated.

Health Impacts of Operational Toxic Air Contaminants

As noted above, CEQA does not require an EIR to analyze the impacts of the environment on the project. Nonetheless, the City has an interest in the safety of its citizens and desires information about the impacts of existing freeways on project residents, which is provided here for informational purposes.

OEHHA recommends that an exposure duration (residency time) of 30 years be used to estimate individual cancer risk for the MEIR starting in the third trimester to accommodate the increased susceptibility of exposures in early life (OEHHA 2015).

Based on the 30-year exposure scenario, the MEIR for cancer risk would be at the western portion of the project site, north of Independence Drive. This same receptor would be exposed to the maximum chronic and acute health impact. Table 4.2-10 summarizes the HRA results based on the HRA methodology described above and contained in Appendix C2.

Table 4.2-10. Summary of Maximum Cancer and Chronic Health Risks - Unmitigated

Impact Parameter	Units	Project Impact	CEQA Threshold	Level of Significance
Maximally Exposed Individual Resident				
Cancer Risk	Per million	8.77	10	Less than significant
Chronic Hazard Index	Index value	0.015	1.0	Less than significant
Acute Hazard Index	Index value	0.0061	1.0	Less than significant
$PM_{2.5}$ Concentration	μg/m³	0.10	0.3	Less than significant

Source: Appendix C2.
Notes: CEQA = California Environmental Quality Act; HRA = Health Risk Assessment

As shown in Table 4.2-10, the maximum potential cancer risk at the project site from on-road vehicle exhaust along Highways 101 and 84, Marsh Road, and Chrysler Drive would be approximately 8.77 in a million. The maximum chronic hazard and acute hazard indices would be 0.015 and 0.0061, respectively. The maximum $PM_{2.5}$ concentration would be 0.10 μg/m³. As such, the future residents at the project site would be exposed to less than significant cancer, chronic, and acute health impacts, as well as less than significant $PM_{2.5}$ concentrations. Additionally, although traffic volumes are forecast to increase with time due to growth, vehicular emission factors are expected to decrease with time due to California's Statewide regulation to increase fuel efficiency (Assembly Bill 1493, the Pavley I standard) and other State and federal regulations aimed at vehicles emissions reduction, including the requirement to phase out the sale of gas-powered vehicles by 2035.

Regarding long-term operations of the project on existing nearby residents, based on the proposed land uses, the project would not result in any long-term sources of TACs. Further, the project would result in the demolition of five existing office and industrial buildings, which would reduce the generation and exposure of TACs in the vicinity of the project site. Any potential health risk impacts associated with project operations would be **less than significant.**

Local Carbon Monoxide Concentrations

Mobile source impacts occur on two scales of motion. Regionally, project-related travel would add to regional trip generation and increase the vehicle miles traveled within the local airshed and the SFBAAB. Locally, project generated traffic would be added to the City's roadway system near the project site. If such traffic occurs during periods of poor atmospheric ventilation, is composed of a large number of vehicles "cold-started" and operating at pollution-inefficient speeds, and is operating on roadways already crowded with non-project traffic, there is a potential for the formation of microscale CO hotspots in the area immediately around points of congested traffic. Because of continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the SFBAAB is steadily decreasing.

The BAAQMD thresholds of significance for local CO emissions is the 1-hour and 8-hour CAAQS of 20 ppm and 9 ppm, respectively. By definition, these represent levels that are protective of public health. According to the BAAQMD, a project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met (BAAQMD 2017a):

1. 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.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. 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).

As noted previously, the project would generate a net increase of 870 daily traffic trips and would be consistent with the applicable congestion management program. This minimal amount of new traffic trips would comply with the BAAQMD screening criteria. Accordingly, project-related traffic would not exceed CO standards and therefore, no further analysis was conducted for CO impacts. Thus, the CO emissions impact would be considered less-than-significant on a project-level and cumulative basis.

Mitigation Measures

MM-4.2b Construction Equipment Emissions Reductions, to reduce the potential for TAC emissions, specifically diesel particulate matter (DPM) as a result of construction of the project, the applicant shall:

a. Prior to the start of construction activities, the project applicant, or its designee, shall ensure that all 50-horsepower or greater diesel-powered equipment is powered with California Air Resources Board (CARB)-certified Tier 4 Final engines or better. The project applicant shall include this requirement in applicable bid documents and require compliance as a condition of contract. A copy of each equipment unit's certified tier specification and CARB or Bay Area Air Quality Management District (BAAQMD) operating permit (if applicable) should be available upon request at the time of mobilization of each applicable unit of equipment. The City shall require periodic reporting and provision of written documentation by contractors to ensure compliance and shall conduct regular inspections to the maximum extent feasible to ensure compliance.

If the applicant is unable to obtain a necessary piece of equipment with a Tier 4 Final engine, the project representatives or contractors must provide written documentation supported by substantial evidence that is reviewed and approved by the City before using other technologies/strategies. Before an exemption may be considered by the City, the applicant shall: (1) be required to demonstrate that two construction fleet owners/operators in the Bay Area region were contacted and that those owners/operators confirmed Tier 4 Final equipment could not be located within the Bay Area region; and (2) the proposed replacement equipment has been evaluated using the California Emissions Estimator Model or other industry standard emission estimation method and documentation provided to the City to confirm the project-generated emissions would remain below the applicable BAAQMD mass daily thresholds of significance.

The construction contractor(s) shall maintain equipment maintenance records for the construction portion of the project. All construction equipment must be tuned and maintained in compliance with the manufacturer's recommended maintenance schedule and specifications. Upon request for inspection, construction contractor(s) shall make available all maintenance records for equipment used on site within one business day (either hardcopy or electronic versions).

Impact 4.2-4 Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source; the wind speeds and direction; and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public and generate citizen complaints.

Odors would be potentially generated from vehicles and equipment exhaust emissions during construction of the project. Potential odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment, architectural coatings, and asphalt pavement application. Such odors would disperse rapidly from the project site and generally occur at magnitudes and durations that would not affect substantial numbers of people. Therefore, impacts associated with odors during construction would be less than significant.

Common sources of odors include manufacturing plants, rendering plants, coffee roasters, wastewater treatment plants, sanitary landfills, and solid waste transfer stations (BAAQMD 2017a). The project would not result in the creation of a land use that is commonly associated with odors. Therefore, project operations would result in an odor impact that is **less than significant.**

Mitigation Measures

No mitigation measures are required.

Cumulative Impacts

The cumulative context of an air pollutant is dependent on the specific pollutant being considered. O_3 precursors (NOx and ROG) are a regional pollutant; therefore, the cumulative context would be existing and future development within the entire SFBAAB. This means that O_3 precursors generated in one location do not necessarily have O_3 impacts in that area. Instead, precursors from across the region can combine in the upper atmosphere and be transported by winds to various portions of the SFBAAB. Consequently, all O_3 precursors generated throughout the SFBAAB are part of the cumulative context. Particulate matter directly emitted from a project is also generally regarded as having both regional and localized impacts; however, PM_{10} and $PM_{2.5}$ are the largest concern during construction of a proposed project. Furthermore, CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas.

The geographic scope for the project's cumulative analysis includes the City of Menlo Park and surrounding areas within the SFBAAB. The SFBAAB includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara Counties; the western portion of Solano County and the southern portion of Sonoma County.

Cumulative localized impacts could potentially occur if a construction project were to occur concurrently with another off-site project. Construction of other projects in the vicinity, including the Willow Village Master Plan Project, Commonwealth Building 3 Project, the Hotel Moxy Project, and the 3705 Haven Avenue Project could occur concurrently with the proposed project. For example, the Willow Village Master Plan Project EIR assumed construction beginning in 2023 with buildout in 2026, and the Commonwealth Building 3 Project is expected to be constructed between 2023 and 2025. However, all of these projects are consistent with the City's Land Use and Transportation Element ("ConnectMenlo") and must comply with ConnectMenlo EIR air quality mitigation measures, consisting of the following:

Mitigation Measure AQ-2b1: As part of the City's development approval process, the City shall require applicants for future development projects to comply with the current Bay Area Air Quality Management District's basic control measures for reducing construction emissions of PM_{10} (Table 8-1, Basic Construction Mitigation Measures Recommended for All Proposed Projects, of the BAAQMD CEQA Guidelines).

Mitigation Measure AQ-2b2: Prior to issuance of building permits, development project applicants that are subject to CEQA and exceed the screening sizes in the BAAQMD's CEQA Guidelines shall prepare and submit to the City of Menlo Park a technical assessment evaluating potential project construction-related air quality impacts. The evaluation shall be prepared in conformance with the BAAQMD methodology in assessing air quality impacts. If construction-related criteria air pollutants are determined to have the potential to exceed the BAAQMD thresholds of significance, as identified in the BAAQMD CEQA Guidelines, the City of Menlo Park shall require that applicants for new development projects incorporate mitigation measures to reduce air pollutant emissions during construction activities to below these thresholds (e.g., Table 8-2, Additional Construction Mitigation Measures Recommended for Projects with Construction Emissions Above the Threshold of the BAAQMD CEQA Guidelines, or applicable construction mitigation measures subsequently approved by BAAQMD). These identified measures shall be incorporated into all appropriate construction documents (e.g., construction management plans) submitted to the City and shall be verified by the City's Building Division and/or Planning Division.

Mitigation Measure AQ-3a: Applicants for future non-residential land uses within the city that: 1) have the potential to generate 100 or more diesel truck trips per day or have 40 or more trucks with operating diesel-powered TRUs, and 2) are within 1,000 feet of a sensitive land use (e.g., residential, schools, hospitals, nursing homes), as measured from the property line of a proposed project to the property line of the nearest sensitive use, shall submit a health risk assessment (HRA) to the City of Menlo Park prior to future discretionary project approval. The HRA shall be prepared in accordance with policies and procedures of the State Office of Environmental Health Hazard Assessment and the Bay Area Air Quality Management District. If the HRA shows that the incremental cancer risk exceeds 10 in one million (10E-06), $PM_{2.5}$ concentrations exceed 0.3 μg/m3 , or the appropriate noncancer hazard index exceeds 1.0, the applicant will be required to identify and demonstrate that mitigation measures are capable of reducing potential cancer and noncancer risks to an acceptable level, including appropriate enforcement mechanisms. Mitigation measures may include but are not limited to:

- Restricting idling on-site beyond Air Toxic Control Measures idling restrictions, as feasible.
- Electrifying warehousing docks.
- Requiring use of newer equipment and/or vehicles.
- Restricting off-site truck travel through the creation of truck routes.

Mitigation measures identified in the project-specific HRA shall be identified as mitigation measures in the environmental document and/or incorporated into the site development plan as a component of a proposed project.

Mitigation Measure AQ-3b: Applicants for residential and other sensitive land use projects (e.g., hospitals, nursing homes, day care centers) in Menlo Park within 1,000 feet of a major sources of toxic air contaminants (TACs) (e.g., warehouses, industrial areas, freeways, and roadways with traffic volumes over 10,000 vehicle per day), as measured from the property line of the project to the property line of the source/edge of the nearest travel lane, shall submit a health risk assessment (HRA) to the City of Menlo Park prior to future discretionary Project approval. The HRA shall be prepared in accordance with policies and procedures of the State Office of Environmental Health Hazard Assessment (OEHHA) and the Bay Area Air Quality Management District. The latest OEHHA guidelines shall be used for the analysis, including age sensitivity factors, breathing rates, and body weights appropriate for children ages 0 to 16 years. If the HRA shows that the incremental cancer risk exceeds ten in one million (10E-06), $PM_{2.5}$ concentrations exceed 0.3 $\mu g/m^3$, or the appropriate noncancer hazard index exceeds 1.0, the applicant will be required to identify and demonstrate that mitigation measures are capable of reducing potential cancer and non-cancer risks to an acceptable level (i.e., below ten in one million or a hazard index of 1.0), including appropriate enforcement mechanisms. Measures to reduce risk may include but are not limited to:

- Air intakes located away from high volume roadways and/or truck loading zones.
- Heating, ventilation, and air conditioning systems of the buildings provided with appropriately sized maximum efficiency rating value (MERV) filters.

Measures identified in the HRA shall be included in the environmental document and/or incorporated into the site development plan as a component of the proposed project. The air intake design and MERV filter requirements shall be noted and/or reflected on all building plans submitted to the City and shall be verified by the City's Building Division and/or Planning Division.

As the ConnectMenlo EIR stated, "[s]imilar to GHG emissions impacts, air quality impacts are regional in nature as no single project generates enough emissions that would cause an air basin to be designated as nonattainment area." Nevertheless, the ConnectMenlo EIR concluded that criteria air pollutant emissions generated by cumulative development associated with buildout of the General Plan would exceed BAAQMD's project-level significance thresholds and would contribute to the nonattainment designations of the Air Basin. Thus, the ConnectMenlo EIR identified a significant cumulative air quality impact associated with construction activities.

Impact 4.2-5 Would the project result in cumulatively considerable air quality impacts?

Construction-Related Cumulative Impacts

The potential for the project to result in a cumulatively considerable air quality impact is evaluated in Impact 4.2-2. The BAAQMD maintains that the significance thresholds are intended to maintain ambient air quality concentrations of the criteria air pollutants state and federal standards and to prevent a cumulatively considerable contribution to regional nonattainment with ambient air quality standards. As discussed, construction of the project is not expected to exceed the BAAQMD average daily significance thresholds. In addition, MM 4.2a would ensure that the project implements the BAAQMD recommended BMPs to reduce fugitive dust impacts from construction activities. Further, as discussed under Impact 4.2-3, the project's short-term construction-related TAC emissions could result in a significant health risk but this risk would be reduced to a less-than-significant level with implementation of MM 4.2b. Thus, the project would not substantially contribute to health risks from air pollutants in the area. In addition, as discussed above, it is reasonable to assume that construction emissions of the other construction projects in the region would be limited by applicable BAAQMD regulations and rules. Therefore, with implementation of MM 4.2a and MM 4.2b to minimize project-related construction emissions, and because project construction activities throughout the region would comply with BAAQMD rules, project-generated construction emissions would not be cumulatively considerable and the proposed project would make a less than cumulatively considerable contribution to the significant cumulative impact.

Operation-Related Cumulative Impacts

As discussed under Impact 4.2-2 above, the project would make a less than cumulatively considerable contribution to long-term operational air quality impacts for all criteria pollutants, and the project would not conflict with the BAAQMD 2017 Clean Air Plan, which addresses the cumulative emissions in the SFBAAB. Because the BAAQMD air quality plans are regularly updated and consider the cumulative emissions of existing and projected development, it may be concluded that a project that conforms to the applicable air quality plans and does not have a direct air quality impact would not have or contribute to a significant cumulative regional air quality impact. Therefore, the project would make a less than cumulatively considerable contribution to air quality impacts related to long-term regional emissions of all criteria pollutants. As such, the project potential to result in a cumulatively considerable increase of any criteria pollutant for which the SFBAAB is in nonattainment under an applicable NAAQS or CAAQS O_3, PM_{10}, and $PM_{2.5}$ would be less than significant.

The analysis for local CO hotspot impacts under Impact 4.2-2 is based on the BAAQMD CEQA Guidelines. The qualitative assessment that demonstrated a less than significant impact is inherently a cumulative analysis, and the cumulative impact would be less than significant. Because the project would not include non-permitted stationary sources of TACs onsite and permitted emergency generators would only be used for maintenance and testing, it would not contribute to long-term health risk impacts in the project area.

The project is not anticipated to generate nuisance operational odors and there is no existing significant cumulative odor impact in the area; therefore, the project would not combine with other uses to create a significant cumulative odor impact and would have a less than cumulatively considerable operational odor impact.

Mitigation Measures

MM 4.2a is required as discussed under Impact 4.2-3 and MM 4.2b is required as discussed under Impact 4.2-4. No additional mitigation measures are required.

4.2.5 References

13 CCR 2025. Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles.

13 CCR 2449–2449.3 and Appendix A. General Requirements for In-Use Off-Road Diesel-Fueled Fleets.14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

17 CCR 93000. Substances Identified as Toxic Air Contaminants. In Subchapter 7, Toxic Air Contaminants.

BAAQMD (Bay Area Air Quality Management District). 2009. *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*. October 2009. Accessed May 2019. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/revised-draft-ceqa-thresholds-justification-report-oct-2009.pdf?la=en.

BAAQMD. 2010. *California Environmental Quality Act Air Quality Guidelines*. May 2010. Accessed May 2019. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/draft_baaqmd_ceqa_guidelines_may_2010_final.pdf?la=en.

BAAQMD. 2011. *Recommended Methods for Screening and Modeling Local Risks and Hazards*. May 2011. Accessed August 2020. https://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20Modeling%20Approach.ashx.

BAAQMD. 2017a. *California Environmental Quality Act Air Quality Guidelines.* Updated May 2017. Accessed May 2019. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

BAAQMD. 2017b. *Spare the Air: Cool the Climate - Final 2017 Clean Air Plan.* April 19, 2017. Accessed May 2019. http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en.

BAAQMD. 2017c. "Air Quality Standards and Attainment Status." Last updated January 5, 2017. Accessed March 2019. http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status.

BAAQMD. 2019. "San Mateo County." Last updated February 14, 2019. Accessed February 2021. https://www.baaqmd.gov/about-the-air-district/in-your-community/san-mateo-county.

BAAQMD. 2021. Public Records Request for Pre-Processed Meteorological Data from San Carlos Airport. December 2021.

CAPCOA. 2021. *California Emissions Estimator Model (CalEEMod) User's Guide Version 2020.4.0* Prepared by BREEZE Software, A Division of Trinity Consultants in collaboration with South Coast Air Quality Management District and the California Air Districts. May 2021. Accessed May 2021. http://www.caleemod.com.

CARB (California Air Resources Board). 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October 2000. Accessed May 2019. http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf.

CARB. 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005. Accessed August 2016. http://www.arb.ca.gov/ch/landuse.htm.

CARB. 2009. Fact Sheet: Air Pollution Sources, Effects and Control.

CARB. 2016a. "Ambient Air Quality Standards." May 4, 2016. Accessed December 2021. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

CARB. 2016b. 2016 Mobile Source Strategy. May 2016. Accessed November 2021. https://ww3.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf.

CARB. 2019a. "Glossary of Air Pollution Terms." CARB website. Accessed June 2019. http://www.arb.ca.gov/html/gloss.htm.

CARB. 2019b. "Ozone & Health." Accessed December 2021. https://ww2.arb.ca.gov/resources/ozone-and-health.

CARB. 2019c. "Nitrogen Dioxide & Health." https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health.

CARB. 2019d. "Carbon Monoxide & Health." https://ww2.arb.ca.gov/resources/carbon-monoxide-and-health.

CARB. 2019e. "Sulfur Dioxide & Health." https://ww2.arb.ca.gov/resources/sulfur-dioxide-and-health.

CARB. 2019f. "Overview: Diesel Exhaust and Health." Overview: Diesel Exhaust & Health, California Air Resources Board.

CARB. 2020. "Area Designation Maps/State and National." Last updated October 2020. https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations.

CARB. 2021a. "iADAM: Air Quality Data Statistics." Accessed December 2021. http://www.arb.ca.gov/adam/topfour/topfour1.php.

CARB. 2021b. Advanced Clean Cars Program. Accessed November 2021. https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program.

CARB. 2021c. Advanced Clean Trucks Fact Sheet. August 20, 2021. Accessed November 2021. https://ww2.arb.ca.gov/sites/default/files/2021-08/200625factsheet_ADA.pdf.

CARB. 2021c. 2020 Mobile Source Strategy. September 2021. Accessed November 2021. https://ww2.arb.ca.gov/sites/default/files/2021-09/Proposed_2020_Mobile_Source_Strategy.pdf.

CARB. 2022. "Inhalable Particulate Matter and Health ($PM_{2.5}$ and PM_{10})." https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health

Eckerle and Jones. 2015. *2015 Hydrogen Station Permitting Guidebook*. Accessed 2022. https://static.business.ca.gov/wp-content/uploads/2019/12/GO-Biz_Hydrogen-Station-Permitting-Guidebook_Sept-2020.pdf

EPA (U.S. Environmental Protection Agency). 2013. *Integrated Science Assessment of Ozone and Related Photochemical Oxidants*. U.S. EPA, EPA/600R-10/076F, 2013.

EPA. 2016b. *Integrated Science Assessment for Oxides of Nitrogen-Health Criteria (2016 Final Report)*. U.S. EPA, EPA/600/R-15/068, 2016.

EPA. 2020a. "EPA Region 9 Air Quality Maps and Geographic Information." Last updated November 11, 2020. Accessed December 2020. https://www3.epa.gov/region9/air/maps/.

EPA. 2020b. "What is MERV Rating?" May 5, 2020. Accessed August 2020. https://www.epa.gov/indoor-air-quality-iaq/what-merv-rating-1.

EPA. 2021a. "Criteria Air Pollutants." August 16, 2021. Accessed January 2022. https://www.epa.gov/criteria-air-pollutants.

EPA. 2021b. "AirData: Access to Air Pollution Data." Last updated November 17, 2020. Accessed December 2021. http://www.epa.gov/airdata/ad_rep_mon.html.

EPA. 2021c. *Transportation Conformity Guidance for Quantitative Hotspot Analyses of $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013C6A.pdf

Governor's Interagency Working Group on Zero-Emission Vehicles. 2016. *2016 ZEV Action Plan*. Accessed 2022. https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/2016-zev-action-plan-a11y.pdf

Governor's Interagency Working Group on Zero-Emission Vehicles. 2018. *2018 ZEV Action Plan Priorities Update*. Accessed 2022. https://static.business.ca.gov/wp-content/uploads/2019/12/2018-ZEV-Action-Plan-Priorities-Update.pdf

NRC (National Research Council). 2005. Interim Report of the Committee on Changes in New Source Review Programs for Stationary Sources of Air Pollutants. Washington, DC: The National Academies Press. https://doi.org/10.17226/11208.

OEHHA (Office of Environmental Health Hazard Assessment). 2003. *Air Toxics Hot Spots Program Risk Assessment Guidelines - The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. August 2003. Accessed April 2019.

OEHHA . 2015. *Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*. February 2015.

SJVAPCD (San Joaquin Valley Air Pollution Control District). 2006.