# 4.2 AIR QUALITY

This section of the Draft Supplemental EIR evaluates the impacts of the Revised Project on air quality, locally and regionally. "Emissions" refers to the actual quantity of pollutant, measured in pounds per day or tons per year. "Concentrations" refers to the amount of pollutant material per volumetric unit of air. Concentrations are measured in parts per million (ppm), parts per billion (ppb), or micrograms per cubic meter ($\mu g/m^3$).

This section is based on the methodology recommended by the Bay Area Air Quality Management District (BAAQMD) for project-level review. The analysis contained herein focuses on air pollution from regional emissions and localized pollutant concentrations from buildout of the Revised Project compared to that identified in the Certified EIR. Transportation sector emissions are based on trip generation provided by TJKM Transportation Consultants. Criteria air pollutant emissions modeling is in Appendix F, Air Quality and Greenhouse Gas Modeling. A Health Risk Assessment for off-site construction risk and on-site risk is in Appendix G, Health Risk Assessment.

## 4.2.1 ENVIRONMENTAL SETTING

California is divided geographically into 15 air basins for the purpose of managing the air resources of the State on a regional basis. An air basin generally has similar meteorological and geographic conditions throughout. Lafayette is in the San Francisco Bay Area Air Basin (SFBAAB or Air Basin). The discussion below identifies the natural factors in the Air Basin that affect air pollution. Air pollutants of concern are criteria air pollutants and toxic air contaminants (TACs). Federal, State, and local air districts have adopted laws and regulations intended to control and improve air quality. The regulatory framework that is potentially applicable to the Revised Project is also summarized below.

### 4.2.1.1 SAN FRANCISCO AIR BASIN

The BAAQMD is the regional air quality agency for the Air Basin, which comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties; the southern portion of Sonoma County; and the southwestern portion of Solano County. Air quality in this area is determined by natural factors such as topography, meteorology, and climate, as well as by the presence of existing air pollution sources and ambient conditions.[1]

[1] This section describing the air basin is from Bay Area Air Quality Management District, 2010 (Revised 2011), Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

## Meteorology

The Air Basin is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Coast Range[2] splits in the Bay Area, creating a western coast gap, the Golden Gate, and an eastern coast gap, the Carquinez Strait, which allows air to flow in and out of the Bay Area and the Central Valley.

The climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below the surface because of the northwesterly flow produces a band of cold water off the California coast.

The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold-water band, resulting in condensation and the presence of fog and stratus clouds along the Northern California coast. In the winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in a low air pollution potential.

## Wind Patterns

During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately south of Mount Tamalpais in Marin County, the northwesterly winds accelerate considerably and come more directly from the west as they stream through the Golden Gate. This channeling of wind through the Golden Gate produces a jet that sweeps eastward and splits when it meets the East Bay hills, to the northwest toward Richmond and to the southwest toward San Jose.

Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, the Golden Gate, or the San Bruno gap. For example, the average wind speed at San Francisco International Airport in July is about 17 knots (from 3:00 p.m. to 4:00 p.m.), compared with only 7 knots in San Jose and less than 6 knots at the Farallon Islands.

The sea breeze flows in from the coast to the Central Valley and begins developing at or near ground level along the coast in late morning or early afternoon. As the day progresses, the sea breeze layer deepens and increases in velocity while spreading inland. The depth of the sea breeze depends in large part on the height and strength of the inversion. Under normal atmospheric conditions, the air in the lower atmosphere is warmer than the air above it. An inversion is a change in the normal conditions that causes the temperature

[2] The Coast Ranges traverses California's west coast from Humboldt County to Santa Barbara County.

gradient to be reversed, or inverted. If the inversion is low and strong, and hence stable, the flow of the sea breeze will be inhibited, and stagnant conditions are likely to result.

In the winter, the Air Basin frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Winter stagnation episodes (i.e. conditions where there is little mixing, which occurs when there is a lack of or little wind) are characterized by nighttime drainage flows in coastal valleys. Drainage is a reversal of the usual daytime airflow patterns; air moves from the Central Valley toward the coast and back down toward the Bay from the smaller valleys in the Air Basin.

## Temperature

Summertime temperatures in the Air Basin are determined in large part by the effect of differential heating between land and water surfaces. Because land tends to heat up and cool off more quickly than water, a large-scale gradient (differential) in temperature is often created between the coast and the Central Valley, and small-scale local gradients are often produced along the shorelines of the ocean and bays. The temperature gradient near the ocean is also exaggerated, especially in summer, because of the upwelling of cold water from the ocean bottom along the coast. On summer afternoons, the temperatures at the coast can be 35 degrees Fahrenheit cooler than temperatures 15 to 20 miles inland; at night, this contrast usually decreases to less than 10 degrees Fahrenheit.

In the winter, the relationship of minimum and maximum temperatures is reversed. During the daytime the temperature contrast between the coast and inland areas is small, whereas at night the variation in temperature is large.

## Precipitation

The Air Basin is characterized by moderately wet winters and dry summers. Winter rains (November through March) account for about 75 percent of the average annual rainfall. The amount of annual precipitation can vary greatly from one part of the Air Basin to another, even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys.

During rainy periods, ventilation (rapid horizontal movement of air and injection of cleaner air) and vertical mixing (an upward and downward movement of air) are usually high, and thus pollution levels tend to be low (i.e. air pollutants are dispersed more readily into the atmosphere rather than accumulate under stagnant conditions). However, during the winter, frequent dry periods do occur, where mixing and ventilation are low and pollutant levels build up.

## Wind Circulation

Low wind speed contributes to the buildup of air pollution because it allows more pollutants to be emitted into the air mass per unit of time. Light winds occur most frequently during periods of low sun (fall, winter,

and early morning) and at night. These are also periods when air pollutant emissions from some sources are at their peak, namely, commuter traffic (early morning) and wood-burning appliances (nighttime). The problem can be compounded in valleys, when weak flows carry the pollutants up-valley during the day, and cold air drainage flows move the air mass down-valley at night. Such restricted movement of trapped air provides little opportunity for ventilation and leads to buildup of pollutants to potentially unhealthful levels.

### Inversions

As described above, an inversion is a layer of warmer air over a layer of cooler air. Inversions affect air quality conditions significantly because they influence the mixing depth (i.e. the vertical depth available for diluting air contaminants near the ground). There are two types of inversions that occur regularly in the Air Basin. Elevation inversions[3] are more common in the summer and fall, and radiation inversions[4] are more common during the winter. The highest air pollutant concentrations in the Air Basin generally occur during inversions.

## 4.2.1.2 AIR POLLUTANTS OF CONCERN

A substance in the air that can harm humans and the environment is known as an air pollutant. Pollutants can be in the form of solid particles, liquid droplets, or gases. In addition, they may be natural or human-caused. Pollutants can be classified as primary or secondary. Usually, primary pollutants are directly emitted from a process, such as ash from a volcanic eruption, carbon monoxide from a motor vehicle exhaust, or sulfur dioxide from a factory. Secondary pollutants are not emitted directly, but form in the air when primary pollutants react or interact.

### Criteria Air Pollutants

The pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and State law. Air pollutants are categorized as primary and/or secondary pollutants. Primary air pollutants are carbon monoxide (CO), reactive organic gases (ROG), nitrogen oxides ($NO_x$), sulfur dioxide ($SO_2$), coarse inhalable particulate matter ($PM_{10}$), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb). Of these, CO, $SO_2$, $NO_2$, $PM_{10}$, and $PM_{2.5}$ are "criteria air pollutants," which means that ambient air quality standards (AAQS), which are discussed further in Section 4.2.1.3, have been established for them. ROG and $NO_x$ are criteria pollutant precursors that form secondary criteria air pollutants through chemical and photochemical reactions in the atmosphere. Ozone ($O_3$) and nitrogen dioxide ($NO_2$) are the principal secondary pollutants.

A description of each of the primary and secondary criteria air pollutants and their known health effects is presented below.

[3] When the air blows over elevated areas, it is heated as it is compressed into the side of the hill/mountain. When that air comes over the top, it is warmer than the cooler air of the valley.

[4] During the night, the ground cools off, radiating the heat to the sky.

- **Carbon Monoxide (CO)** is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. CO is a primary criteria air pollutant. CO concentrations tend to be the highest during winter mornings with little or no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, motor vehicles operating at slow speeds are the primary source of CO in the Air Basin. Emissions are highest during cold starts, hard acceleration, stop-and-go driving, and low speeds. New findings indicate that CO emissions per mile are lowest at about 45 miles per hour (mph) for the average light-duty motor vehicle and begin to increase again at higher speeds. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces its oxygen-carrying capacity. This results in less oxygen reaching the brain, heart, and other body tissues. This is especially dangerous for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses. Even healthy people exposed to high CO concentrations can experience headaches, dizziness, fatigue, unconsciousness, and death.[5] The Air Basin is designated under the California and National AAQS as being in attainment of CO criteria levels.[6]
- **Reactive Organic Gases (ROGs)** are compounds composed primarily of hydrogen and carbon atoms. Internal combustion in motor vehicles is the major source of ROGs. Other sources of ROGs are evaporative emissions from paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by ROGs, but by reactions of ROGs to form secondary pollutants such as $O_3$. There are no AAQS established for ROGs. However, because they contribute to the formation of $O_3$, BAAQMD has established a significance threshold for this pollutant.
- **Nitrogen Oxides ($NO_X$)** are a by-product of fuel combustion and contribute to the formation of $O_3$, $PM_{10}$, and $PM_{2.5}$. The two major components of $NO_x$ are nitric oxide (NO) and nitrogen dioxide ($NO_2$). The principal component of $NO_x$ produced by combustion is NO, but NO reacts with oxygen to form $NO_2$, creating the mixture of NO and $NO_2$ commonly called $NO_x$. $NO_2$ acts as an acute irritant and in equal concentrations is more injurious than NO. At atmospheric concentrations, however, $NO_2$ is only potentially irritating. There is some indication of a relationship between $NO_2$ and chronic pulmonary fibrosis. Some increase in bronchitis in children (two and three years old) has also been observed at concentrations below 0.3 ppm. $NO_2$ absorbs blue light; the result is a brownish-red cast to the atmosphere and reduced visibility. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure.[7] The Air Basin is designated an attainment area for $NO_2$ under the National and California AAQS.[8]

[5] Bay Area Air Quality Management District (BAAQMD), 2010 (Revised 2011), Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

[6] California Air Resources Board (CARB), 2014, Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, June.

[7] Bay Area Air Quality Management District (BAAQMD), 2010 (Revised 2011). Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

[8] California Air Resources Board (CARB), June 2014, Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm.

- **Sulfur Dioxide ($SO_2$)** is a colorless, pungent, irritating gas formed by the combustion of sulfurous fossil fuels. It results from burning high-sulfur-content fuel oils and coal and from chemical processes at chemical plants and refineries. Gasoline and natural gas have very low sulfur content and do not release significant quantities of $SO_2$. When $SO_2$ forms sulfates ($SO_4$) in the atmosphere, these pollutants are referred to collectively as sulfur oxides ($SO_x$). Thus, $SO_2$ is both a primary and secondary criteria air pollutant. At sufficiently high concentrations, $SO_2$ may irritate the upper respiratory tract. At lower concentrations and when combined with particulates, $SO_2$ may do greater harm by injuring lung tissue.[9] The Air Basin is designated an attainment area for $SO_2$ under the California and National AAQS.[10]
- **Suspended Particulate Matter ($PM_{10}$ and $PM_{2.5}$)** consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are recognized and regulated. Inhalable coarse particles, or $PM_{10}$, have an aerodynamic diameter of 10 microns (i.e. 10 millionths of a meter or 0.0004 inch) or less. Inhalable fine particles, or $PM_{2.5}$, have an aerodynamic diameter of 2.5 microns or less (i.e. 2.5 millionths of a meter or 0.0001 inch).

  Some particulate matter, such as pollen, occurs naturally. In the Air Basin most particulate matter is caused by combustion, factories, construction, grading, demolition, agricultural activities, and motor vehicles. Extended exposure to particulate matter can increase the risk of chronic respiratory disease. $PM_{10}$ bypasses the body's natural filtration system more easily than larger particles and can lodge deep in the lungs. The US Environmental Protection Agency (EPA) scientific review concluded that $PM_{2.5}$ penetrates even more deeply into the lungs, which makes it more likely to contribute to health effects and at concentrations well below current $PM_{10}$ standards. These health effects include premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms (e.g. irritation of the airways, coughing, or difficulty breathing). Motor vehicles are currently responsible for about half of the particulates in the Air Basin. Wood burning in fireplaces and stoves is another large source of fine particulates.[11]

  Both $PM_{10}$ and $PM_{2.5}$ may adversely affect the human respiratory system, especially in people who are naturally sensitive or susceptible to breathing problems. These health effects include premature death and increased hospital admissions and emergency room visits (primarily the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (children and individual with asthma); and alterations in lung tissue and structure and in respiratory tract defense mechanisms.[12] Emerging evidence indicates particulates that are even smaller—an aerodynamic diameter of 0.1 microns or less (i.e. 0.1 millionths of a meter or 0.000004 inch)—known as ultrafine particulates

[9] Bay Area Air Quality Management District (BAAQMD), 2010 (Revised 2011). Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

[10] California Air Resources Board (CARB), June 2014, Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm.

[11] Bay Area Air Quality Management District (BAAQMD), 2010 (Revised 2011). Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

[12] South Coast Air Quality Management District (SCAQMD), 2005. *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning*.

(UFPs), have human health implications; UFPs' toxic components may initiate or facilitate biological processes that may lead to adverse effects to the heart, lungs, and other organs. However, the EPA and the California Air Resources Board (CARB) have yet to adopt AAQS to regulate these particulates. Diesel particulate matter (DPM) is also classified a carcinogen by CARB. The Air Basin is designated nonattainment under the California AAQS for $PM_{10}$ and nonattainment under both the California and National AAQS for $PM_{2.5}$.[13,14]

- **Ozone ($O_3$)** is commonly referred to as "smog" and is a gas that is formed when ROGs and $NO_x$, both by-products of internal combustion engine exhaust, undergo photochemical reactions, which are reactions in the presence of sunlight. $O_3$ is a secondary criteria air pollutant. $O_3$ concentrations are generally highest during the summer months when direct sunlight, light winds, and warm temperatures create favorable conditions for its formation. $O_3$ poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. $O_3$ levels usually build up during the day and peak in the afternoon. Short-term exposure can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, it can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Chronic exposure to high ozone levels can permanently damage lung tissue. $O_3$ can also damage plants and trees and materials such as rubber and fabrics.[15] The Air Basin is designated nonattainment of the 1-hour California AAQS and 8-hour California and National AAQS for $O_3$.[16]
- **Lead (Pb)** is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

  Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the EPA set national regulations to gradually reduce the lead content of gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The EPA banned the use of leaded gasoline in highway vehicles in December 1995. As a result, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically.[17] The Air Basin is

[13] California Air Resources Board (CARB), June 2014, Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm.

[14] On January 9, 2013, the EPA issued a final rule to determine that the SFBAAB has attained the 24-hour $PM_{2.5}$ National AAQS. This action suspends federal State Implementation Plan planning requirements for the Bay Area. The SFBAAB will continue to be designated nonattainment for the National 24-hour $PM_{2.5}$ standard until such time as BAAQMD elects to submit a redesignation request and a maintenance plan to EPA and EPA approves the proposed redesignation.

[15] Bay Area Air Quality Management District (BAAQMD), 2010 (Revised 2011). Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

[16] California Air Resources Board (CARB), June 2014, Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm.

[17] Bay Area Air Quality Management District (BAAQMD), 2010 (Revised 2011). Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

designated in attainment of the California and National AAQS for lead.[18] Because emissions of lead are found only in projects that are permitted by BAAQMD, lead is not an air quality of concern for the Revised Project.

## Toxic Air Contaminants

Public exposure to TACs is a significant environmental health issue in California. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The California Health and Safety Code define a TAC as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." A substance that is listed as a hazardous air pollutant pursuant to Section 112(b) of the federal Clean Air Act (42 U.S. Code Section 7412[b]) is a TAC. Under State law, the California Environmental Protection Agency, acting through CARB, is authorized to identify a substance as a TAC if it is an air pollutant that may cause or contribute to an increase in mortality or serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics "Hot Spot" Information and Assessment Act of 1987). The Tanner Air Toxics Act sets up a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an "airborne toxics control measure" for sources that emit designated TACs. If there is a safe threshold for a substance (i.e. a point below which there is no toxic effect), the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions. To date, CARB has established formal control measures for 11 TACs that are identified as having no safe threshold.

Air toxics from stationary sources are also regulated in California under the Air Toxics "Hot Spot" Information and Assessment Act of 1987. Under this law, TAC emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment, and if specific thresholds are exceeded, results must be communicated to the public through notices and public meetings.

As of the last update to the TAC list in December 1999, CARB had designated 244 compounds as TACs.[19] Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most significant being particulate matter from diesel-fueled engines.

[18] California Air Resources Board (CARB), June 2014, Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm.

[19] California Air Resources Board (CARB), 1999. *Final Staff Report: Update to the Toxic Air Contaminant List*.

In 1998, CARB identified DPM as a TAC. Previously, the individual chemical compounds in diesel exhaust were considered TACs. Almost all DPM is 10 microns or less in diameter. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lungs.

## 4.2.1.3 REGULATORY FRAMEWORK

This section describes the federal, State and local regulations applicable to air quality.

## Federal and State Regulations

### *Ambient Air Quality Standards*

The Clean Air Act (CAA) was passed in 1963 by the US Congress and has been amended several times. The 1970 Clean Air Act amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including nonattainment requirements for areas not meeting National AAQS and the Prevention of Significant Deterioration program. The 1990 amendments are the latest in a series of federal efforts to regulate the protection of air quality in the United States. The CAA allows states to adopt more stringent standards or to include other pollution species. The California Clean Air Act, signed into law in 1988, requires all areas of the State to achieve and maintain the California AAQS by the earliest practical date. The California AAQS tend to be more restrictive than the National AAQS.

The National and California AAQS are the levels of air quality considered to provide a margin of safety in the protection of the public health and welfare. They are designed to protect "sensitive receptors" most susceptible to further respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both California and the federal government have established health-based AAQS for seven air pollutants, which are shown in Table 4.2-1. These pollutants are ozone ($O_3$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), coarse inhalable particulate matter ($PM_{10}$), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

# AIR QUALITY

TABLE 4.2-1 AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS

| Pollutant | Averaging Time | California Standard | Federal Primary Standard | Major Pollutant Sources |
|---|---|---|---|---|
| Ozone ($O_3$) | 1 hour | 0.09 ppm | * | Motor vehicles, paints, coatings, and solvents. |
| | 8 hours | 0.070 ppm | 0.075 ppm | |
| Carbon Monoxide (CO) | 1 hour | 20 ppm | 35 ppm | Internal combustion engines, primarily gasoline-powered motor vehicles. |
| | 8 hours | 9.0 ppm | 9 ppm | |
| Nitrogen Dioxide ($NO_2$) | Annual Average | 0.030 ppm | 0.053 ppm | Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads. |
| | 1 hour | 0.18 ppm | 0.100 ppm | |
| Sulfur Dioxide ($SO_2$) | Annual Arithmetic Mean | * | *[a] | Fuel combustion, chemical plants, sulfur recovery plants, and metal processing. |
| | 1 hour | 0.25 ppm | 0.075 ppm | |
| | 24 hours | 0.04 ppm | *[a] | |
| Respirable Course Particulate Matter ($PM_{10}$) | Annual Arithmetic Mean | 20 µg/$m^3$ | * | Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays). |
| | 24 hours | 50 µg/$m^3$ | 150 µg/$m^3$ | |
| Respirable Fine Particulate Matter ($PM_{2.5}$) | Annual Arithmetic Mean | 12 µg/$m^3$ | 12 µg/$m^3$ | Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays). |
| | 24 hours | * | 35 µg/$m^3$ | |
| Lead (Pb) | 30-Day Average | 1.5 µg/$m^3$ | * | Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline. |
| | Calendar Quarterly | * | 1.5 µg/$m^3$ | |
| | Rolling 3-Month Average | * | 0.15 µg/$m^3$ | |
| Sulfates ($SO_4$) | 24 hours | 25 µg/$m^3$ | * | Industrial processes. |
| Visibility Reducing Particles | 8 hours | ExCo =0.23/km visibility of 10≥ miles | * | Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that include dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. |

TABLE 4.2-1 AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS

| Pollutant | Averaging Time | California Standard | Federal Primary Standard | Major Pollutant Sources |
|---|---|---|---|---|
| Hydrogen Sulfide | 1 hour | 0.03 ppm | * | Hydrogen sulfide ($H_2S$) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. |
| Vinyl Chloride | 24 hour | 0.01 ppm | * | Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents. |

Notes: ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter
* Standard has not been established for this pollutant/duration by this entity.
a. On June 2, 2010, a new 1-hour $SO_2$ standard was established and the existing 24-hour and annual primary standards were revoked.
Source: California Air Resources Board, June 2013, Ambient Air Quality Standards, http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

## Regional Regulations

### *Bay Area Air Quality Management District*

BAAQMD is the agency responsible for assuring that the National and California AAQS are attained and maintained in the Air Basin. BAAQMD is responsible for:

- Adopting and enforcing rules and regulations concerning air pollutant sources.
- Issuing permits for stationary sources of air pollutants.
- Inspecting stationary sources of air pollutants.
- Responding to citizen complaints.
- Monitoring ambient air quality and meteorological conditions.
- Awarding grants to reduce motor vehicle emissions.
- Conducting public education campaigns.
- Air quality management planning.

Air quality in the Air Basin has improved significantly since the BAAQMD was created in 1955.[20] The BAAQMD prepares air quality management plans (AQMPs) to attain ambient air quality standards in the Air Basin, ozone attainment plans for the National $O_3$ standard, and clean air plans for the California $O_3$ standard. The BAAQMD prepares these AQMPs in coordination with Association of Bay Area Governments

[20] Bay Area Air Quality Management District (BAAQMD), 2010 (Revised 2011). Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

(ABAG) and the Metropolitan Transportation Commission (MTC). The most recent adopted comprehensive plan is the 2010 Bay Area Clean Air Plan, which was adopted by BAAQMD on September 15, 2010, and incorporates significant new scientific data, updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools.

### BAAQMD 2010 Bay Area Clean Air Plan

The purpose of the 2010 Bay Area Clean Air Plan is to: 1) update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement all feasible measures to reduce $O_3$; 2) consider the impacts of $O_3$ control measures on PM, TAC, and greenhouse gases (GHGs) in a single, integrated plan; 3) review progress in improving air quality in recent years; and 4) establish emission control measures in the 2009 to 2012 timeframe. The 2010 Bay Area Clean Air Plan also provides the framework for the Air Basin to achieve attainment of the California and National AAQS.

### BAAQMD Community Air Risk Evaluation Program

The BAAQMD's Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks from outdoor TACs in the Bay Area. The latest report found that DPM accounted for approximately 85 percent of the cancer risk from airborne toxics. Carcinogenic compounds from gasoline-powered cars and light duty trucks were also significant contributors: 1,3-butadiene contributed 4 percent of the cancer risk–weighted emissions, and benzene contributed 3 percent. Collectively, five compounds—DPM, 1,3-butadiene, benzene, formaldehyde, and acetaldehyde—were found responsible for more than 90 percent of the cancer risk attributed to emissions. All of these compounds are associated with emissions from internal combustion engines. The most important sources of cancer risk–weighted emissions were combustion-related sources of DPM, including on-road mobile sources (31 percent), construction equipment (29 percent), and ships and harbor craft (13 percent). A 75 percent reduction in DPM was predicted between 2005 and 2015 when the inventory accounted for CARB's diesel regulations. Overall, cancer risk from TACs dropped by more than 50 percent between 2005 and 2015, when emissions inputs accounted for State diesel regulations and other reductions.[21]

Modeled cancer risks from TACs in 2005 were highest near sources of DPM—core urban areas, major roadways and freeways, and maritime shipping terminals. Peak modeled risks were found east of San Francisco, near West Oakland, and the Maritime Port of Oakland. BAAQMD identified seven impacted communities in the Bay Area:

- Western Contra Costa County and the cities of Richmond and San Pablo
- Western Alameda County along the Interstate 880 corridor and the cities of Berkeley, Alameda, Oakland, and Hayward
- San Jose

[21] Bay Area Air Quality Management District (BAAQMD), April 2014. *Improving Air Quality & Health in Bay Area Communities, Community Air Risk Program (CARE) Retrospective & Path Forward (2004 – 2013).*

- Eastern side of San Francisco
- Concord
- Vallejo
- Pittsburgh and Antioch

Concord is the closest impacted community to the City of Lafayette. Based on the Phase II boundaries, the Revised Project lies outside this impacted community.

The major contributor to acute and chronic non-cancer health effects in the Air Basin is acrolein ($C_3H_4O$). Major sources of acrolein are on-road mobile sources and aircraft, and areas with high acrolein emissions are near freeways and commercial and military airports.[22] Currently CARB does not have certified emission factors or an analytical test method for acrolein. Since appropriate tools are not available to implement and enforce acrolein emission limits, the BAAQMD does not conduct health risk screening analysis for acrolein emissions.[23]

### *Contra Costa Transportation Authority*

The Contra Costa Transportation Authority (CCTA) is the designated congestion management agency for the county. The CCTA's congestion management plan (CMP) includes traffic level-of-service standards for State highways and principal arterials; multi-modal performance measures to evaluate current and future system; a seven-year capital program of projects to maintain or improve the performance of the system or mitigate the regional impacts of land use projects; a program to analyze the impacts of land use decisions; and a travel demand element that promotes transportation alternatives to the single-occupant vehicle.[24]

Pursuant to the EPA's transportation conformity regulations and the Bay Area Conformity State Implementation Plan (also known as the Bay Area Air Quality Conformity Protocol), the CMP is required to be consistent with the MTC planning process, including regional goals, policies, and projects for the regional transportation improvement program (RTIP). The MTC cannot approve any transportation plan, program, or project unless these activities conform to the State Implementation Plan. The CMP legislation also requires each congestion management agency to prepare and maintain a computerized travel demand model, including a land use database. To meet this requirement, CCTA has developed and maintains a countywide model that runs using TransCAD® software. In 2010, CCTA undertook a comprehensive update of its land use database, consistent with the ABAG 'Current Regional Plans' (aka Sustainable

[22] Bay Area Air Quality Management District (BAAQMD), 2006. *Community Air Risk Evaluation Program, Phase I Findings and Policy Recommendations Related to Toxic Air Contaminants in the San Francisco Bay Area*.

[23] Bay Area Air Quality Management District (BAAQMD), 2010. *Air Toxics NSR Program, Health Risk Screening Analysis Guidelines*.

[24] Contra Costa County Transportation Authority (CCTA), 2013. 2013 Update of the Contra Costa Congestion Management Program. http://www.ccta.net/_resources/detail/10/1. December 18

Communities Strategy Base Case) land use allocation, and is currently updating the model with the adopted Plan Bay Area land use forecasts (P-2013) for use in the 2014 Countywide Transportation Plan,[25]

The federal CAA requires that federal transportation plans be prepared for regions in nonattainment of the federal AAQS. CCTA provides county-level input to MTC during preparation of the regional transportation plan (RTP). The current RTP, Plan Bay Area, was adopted on July 18, 2013. Plan Bay Area was prepared by MTC and ABAG. It incorporates the region's sustainable communities strategy (SCS) pursuant to Senate Bill (SB) 375, which is discussed further in Section 4.5, Greenhouse Gas Emissions, of this Draft Supplemental EIR.[26]

## Local Regulations

The Open Space and Conservation Chapter of the City's General Plan include the following policies relevant to air quality and the Revised Project:

- Policy OS-10.1 Regional Planning: Work with the BAAQMD to implement the Regional Clean Air Plan.
- Policy OS-10.2 Air Quality Standards: Seek to comply with State and federal standards for air quality. Programs under this policy include using BAAQMD's CEQA Guidelines during project CEQA review and evaluating new businesses for air pollutant, TAC, and odor emissions.
- Policy OS-10.3 Vehicle Emissions: Improve air quality by reducing the use of single-occupant automobiles. The Circulation Chapter of the General Plan includes policies and programs designed to reduce single-occupant automobile trips and to encourage public transit.

Other chapters of the General Plan contain policies which would have a beneficial effect on air quality. According to the General Plan, the majority of remaining developable land in Lafayette is located downtown, near public transit and the BART station.

- The Circulation Chapter encourages public transit and calls for extending bicycle and pedestrian paths throughout the community. Bicycle and pedestrian-friendly features are required in new developments downtown.
- The Open Space and Conservation Chapter includes policies to plant additional street trees, reduce energy use, and encourage open space.
- The Land Use and Housing Chapters actively encourage multifamily housing affordable to a range of incomes near to public transit and the BART station.

[25] Contra Costa County Transportation Authority (CCTA), 2013. 2013 Update of the Contra Costa Congestion Management Program. http://www.ccta.net/_resources/detail/10/1. December 18

[26] Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), 2013. *Plan Bay Area, Strategy for a Sustainable Region.*

## 4.2.1.4 EXISTING CONDITIONS

### Attainment Status of the Air Basin

Areas that meet AAQS are classified attainment areas, and areas that do not are classified nonattainment areas. Severity classifications for $O_3$ range from marginal, moderate, and serious to severe and extreme. Table 4.2-2 shows the attainment status for the Air Basin, which is currently designated a nonattainment area for California and National $O_3$, California and National $PM_{2.5}$, and California $PM_{10}$ AAQS.

TABLE 4.2-2 ATTAINMENT STATUS OF CRITERIA POLLUTANTS IN THE SAN FRANCISCO BAY AREA AIR BASIN

| Pollutant | State | Federal |
|---|---|---|
| Ozone – 1-hour | Nonattainment (serious) | Nonattainment |
| Ozone – 8-hour | Nonattainment | Classification revoked (2005) |
| $PM_{10}$ | Nonattainment | Unclassified/Attainment |
| $PM_{2.5}$ | Nonattainment | Nonattainment[a] |
| CO | Attainment | Attainment |
| $NO_2$ | Attainment | Attainment |
| $SO_2$ | Attainment | Attainment |
| Lead | Attainment | Attainment |
| Sulfates | Attainment | Unclassified/Attainment |
| All others | Unclassified/Attainment | Unclassified/Attainment |

a. On January 9, 2013, the EPA issued a final rule to determine that the Air Basin has attained the 24-hour $PM_{2.5}$ National AAQS. This action suspends federal State Implementation Plan planning requirements for the Bay Area. The Air Basin will continue to be designated nonattainment for the National 24-hour $PM_{2.5}$ standard until such time as BAAQMD elects to submit a redesignation request and a maintenance plan to EPA and EPA approves the proposed redesignation.
Source: California Air Resources Board, June 2014, Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm.

### Existing Ambient Air Quality

#### *Existing Air Quality Trends*

Existing levels of ambient air quality and historical trends and projections in the vicinity of the Revised Project have been documented by measurements made by the BAAQMD. The Concord Monitoring Station is the closest air quality monitoring station to the City of Lafayette. Data from this station is summarized in Table 4.2-3. The State and federal $O_3$, federal $PM_{2.5}$, and State $PM_{10}$ standards have been exceeded several

times in the last five years. The State and federal CO and $NO_2$ standards have not been exceeded in the last five years.

TABLE 4.2-3 AMBIENT AIR QUALITY MONITORING SUMMARY

| | Number of Days Thresholds Were Exceeded and Maximum Levels During Such Violations | | | | |
|---|---|---|---|---|---|
| Pollutant/Standard | 2009 | 2010 | 2011 | 2012 | 2013 |
| **Ozone ($O_3$)[a]** | | | | | |
| State 1-Hour ≥ 0.09 ppm | 2 | 2 | 2 | 0 | 0 |
| State 8-hour ≥ 0.07 ppm | 5 | 4 | 5 | 3 | 0 |
| Federal 8-Hour > 0.075 ppm | 2 | 1 | 2 | 2 | 0 |
| Maximum 1-Hour Conc. (ppm) | 0.106 | 0.103 | 0.099 | 0.093 | 0.074 |
| Maximum 8-Hour Conc. (ppm) | 0.088 | 0.087 | 0079 | 0.086 | 0.062 |
| **Carbon Monoxide (CO)[a]** | | | | | |
| State 8-Hour > 9.0 ppm | 0 | 0 | 0 | 0 | * |
| Federal 8-Hour ≥ 9.0 ppm | 0 | 0 | 0 | 0 | * |
| Maximum 8-Hour Conc. (ppm) | 1.09 | 0.95 | 1.24 | 0.82 | * |
| **Nitrogen Dioxide ($NO_2$)[a]** | | | | | |
| State 1-Hour ≥ 0.18 (ppm) | 0 | 0 | 0 | 0 | 0 |
| Maximum 1-Hour Conc. (ppb) | 40.0 | 42.0 | 42.4 | 39.6 | 44.6 |
| **Coarse Particulates ($PM_{10}$)[a]** | | | | | |
| State 24-Hour > 50 µg/$m^3$ | 0 | 0 | 1 | 0 | 1 |
| Federal 24-Hour > 150 µg/$m^3$ | 0 | 0 | 0 | 0 | 0 |
| Maximum 24-Hour Conc. (µg/ $m^3$) | 31.0 | 41.3 | 58.8 | 35.4 | 50.5 |
| **Fine Particulates ($PM_{2.5}$)[a]** | | | | | |
| Federal 24-Hour > 35 µg/$m^3$ | 7 | 3 | 1 | 1 | 2 |
| Maximum 24-Hour Conc. (µg/$m^3$) | 46.8 | 60.3 | 39.0 | 36.4 | 47.5 |

Notes: ppm: parts per million; ppb: parts per billion; µg/$m^3$: or micrograms per cubic meter; * = insufficient data; NA = Not Available
a. Data from the Concord Monitoring Station.
Source: California Air Resources Board, 2014, Air Pollution Data Monitoring Cards (2009, 2010, 2011, 2012, and 2013), http://www.arb.ca.gov/adam/index.html, accessed July 14, 2014.

## Existing Emissions

The Project site was formerly a quarry, resulting in disturbance to approximately 85 percent of the site. Quarry operations ceased in 1970. Currently, the Project site is mostly undeveloped with the exception of a small area in the northeast part of the site that contains 5,000 square feet of residential (vacant) and office uses. The eastern portion of the site has also served as a Christmas tree lot. The Project site generates nominal existing criteria air pollutant emissions.

The dog park site contains an existing single-family house with various accessory structures. It does not contain any uses that generate air pollutant emissions.

### Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardio-respiratory diseases. Residential areas are also considered sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Other sensitive receptors include retirement facilities, hospitals, and schools. Recreational land uses are considered moderately sensitive to air pollution. Sensitive receptors in the vicinity of the Revised Project site are shown in Table 4.2-4.

TABLE 4.2-4 SENSITIVE RECEPTOR LOCATIONS

| Name | Description | Distance (Feet) | Direction |
|---|---|---|---|
| Nearest Residences | Single-Family Residential | <50 | West |
| Additional Residences | Single-Family Residential | 180 | East |
| Sienna Ranch | Outdoor activities/summer camp for children | 130 | Adjacent and north |
| Acalanes High School | School | 700 | Northeast |
| Springhill Elementary School | School | 2,260 | North |
| Diablo Valley Montessori School | Infants to Kindergarten | 1,750 | West |
| Happy Days Learning Center | Day care/after school child care | 1,120 | Northeast and east |

Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial, commercial, retail, and office areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

## 4.2.2 CHANGES IN THE REVISED PROJECT RELATED TO AIR QUALITY

The Revised Project substantially reduces the number of units proposed onsite compared to that evaluated in the Certified EIR. The Revised Project includes development of 44 single-family units, a 3-acre dog park, multi-use sports field, and 6-acres of city park uses. Based on the traffic analysis conducted by TJKM (see Chapter 4.9, Transportation and Traffic), the Revised Project would generate 1,224 daily vehicle trips

during a weekday and 3,932 daily vehicle trips on the weekend, as a result of proposed recreational uses. The Revised Project would generate 808 fewer weekday trips compared to that evaluated in the Certified EIR during the weekday but 1,677 additional trips compared to that evaluated in the Certified EIR during the weekend. Although the Revised Project has a lower residential density, the distance of receptors to State Highway 24 is approximately the same.

As a result of the lower density and proposed mix of land uses, the Revised Project cut and fill would be balanced and would negate the need for soil export. However, the Revised Project includes 3 additional acres across from Deer Hill Road for the dog park. Based on the construction schedule for the Revised Project, despite the additional acreage graded north of Deer Hill Road, the Revised Project grading activities is forecast to take approximately 5 months compared to the Terraces of Lafayette Project grading schedule of 9 months. Overall construction is forecast to take approximately 30 months. Consequently, the Revised Project is anticipated to have an overall longer construction duration but would substantially lessen the time required for grading activities.

## 4.2.3 STANDARDS OF SIGNIFICANCE

The Revised Project would result in a significant air quality impact if it would:

1. Conflict with or obstruct implementation of the applicable air quality plan.
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project area is in non-attainment under applicable federal or State ambient air quality standards (including releasing emissions that exceed quantitative thresholds for ozone precursors).
4. Expose sensitive receptors to substantial pollutant concentrations.

An Initial Study was prepared for the Revised Project (see Appendix A of this Draft Supplemental EIR). Based on the analysis contained in the Initial Study, it was determined that development of the Revised Project would result in a less-than-significant impact for the following significance criterion. This criterion is, therefore, not discussed in this chapter:

- Create objectionable odors affecting a substantial number of people.

### 4.2.3.1 BAAQMD CEQA GUIDELINES

The BAAQMD CEQA Air Quality Guidelines were prepared to assist in the evaluation of air quality impacts of projects and plans proposed within the Bay Area. The guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process, consistent with CEQA requirements, and include recommended thresholds of significance, mitigation measures, and background

air quality information. They also include recommended assessment methodologies for air toxics, odors, and greenhouse gas emissions. In June 2010, the BAAQMD's Board of Directors adopted CEQA thresholds of significance and an update of the CEQA Guidelines. In May 2011, the updated BAAQMD CEQA Air Quality Guidelines were amended to include a risk and hazards threshold for new receptors and modified procedures for assessing impacts related to risk and hazard impacts.

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the BAAQMD CEQA Air Quality Guidelines. The court did not determine whether the thresholds of significance were valid on their merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD complied with CEQA.

Following the court's order, the BAAQMD released revised CEQA Air Quality Guidelines in May of 2012 that include guidance on calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures, and which set aside the significance thresholds. The BAAQMD recognizes that lead agencies may rely on the previously recommended Thresholds of Significance contained in its CEQA Guidelines adopted in 1999. The Alameda County Superior Court, in ordering BAAQMD to set aside the thresholds, did not address the merits of the science or evidence supporting the thresholds. The City finds, therefore, that despite the Superior Court' ruling, and in light of the subsequent case history discussed below, the science and reasoning contained in the BAAQMD 2011 CEQA Air Quality Guidelines provide the latest state-of-the-art guidance available. For that reason, substantial evidence supports continued use of the BAAQMD 2011 CEQA Air Quality Guidelines.

On August 13, 2013, the First District Court of Appeal ordered the trial court to reverse the judgment and upheld the BAAQMD's CEQA Guidelines. California Building Industry Association versus Bay Area Air Quality Management District, Case No. A135335 and A136212 (Court of Appeal, First District, August 13, 2013). In addition to the City's independent determination that use of the BAAQMD's CEQA Guidelines is supported by substantial evidence, they have been found to be valid guidelines for use in the CEQA environmental review process. On November 26, 2013, the California Supreme Court granted review on the issue of whether the toxic air contaminants thresholds are consistent with CEQA; specifically, whether CEQA requires analysis of exposing project residents or users to existing environmental hazards.

While the outcome of this case presents uncertainty for current project applicants and local agencies regarding proper evaluation of toxic air contaminants in CEQA documents, local agencies still have a duty to evaluate impacts related to air quality and greenhouse gas emissions. In addition, CEQA grants local agencies broad discretion to develop their own thresholds of significance, or to rely on thresholds previously adopted or recommended by other public agencies or experts so long as they are supported by substantial evidence. Accordingly, the City of Lafayette is using the BAAQMD's 2011 thresholds to evaluate project impacts in order to protectively evaluate the potential effects of the project on air quality and community risk and hazards.

## Criteria Air Pollutant Emissions and Precursors

### *Regional Significance Criteria*

The BAAQMD's criteria for regional significance for projects that exceed the screening thresholds are shown in Table 4.2-5. Criteria for both the construction and operational phases of the Revised Project are shown.

TABLE 4.2-5 BAAQMD REGIONAL (MASS EMISSIONS) CRITERIA AIR POLLUTANT SIGNIFICANCE THRESHOLDS

| | Construction Phase | Operational Phase | |
|---|---|---|---|
| Pollutant | 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 |
| $PM_{10}$ and $PM_{2.5}$ Fugitive Dust | Best Management Practices | None | None |

Source: Bay Area Air Quality Management District (BAAQMD), 2010 (Revised 2011). Appendix D: Threshold of Significance Justification, in California Environmental Quality Act Air Quality Guidelines.

### *Local CO Hotspots*

Congested intersections have the potential to create elevated concentrations of CO, referred to as CO hotspots. The significance criteria for CO hotspots are based on the California AAQS for CO, which is 9.0 ppm (8-hour average) and 20.0 ppm (1-hour average). However, with the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology, the SFBAAB is in attainment of the California and National AAQS, and CO concentrations in the SFBAAB have steadily declined. Because CO concentrations have improved, the BAAQMD does not require a CO hotspot analysis if the following criteria are met:

- The project is consistent with an applicable congestion management program established by the County Congestion Management Agency for designated roads or highways, the regional transportation plan, and local congestion management agency plans.
- The project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

- The project traffic would not increase traffic volumes at affected intersection 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).[27]

## Community Risk and Hazards

The BAAQMD's significance thresholds for local community risk and hazard impacts apply to both the siting of a new source and to the siting of a new receptor. Local community risk and hazard impacts are associated with TACs and $PM_{2.5}$ because emissions of these pollutants can have significant health impacts at the local level. For assessing community risk and hazards, sources within a 1,000-foot radius are considered. Sources are defined as freeways, high volume roadways (with volume of 10,000 vehicles or more per day or 1,000 trucks per day), and permitted sources.[28]

- The Revised Project would generate TACs and $PM_{2.5}$ during construction activities that could elevate concentrations of air pollutants at the surrounding residential receptors. The thresholds for construction-related local community risk and hazard impacts are the same as for Project operations. The BAAQMD has adopted screening tables for air toxics evaluation during construction.[29] Construction-related TAC and $PM_{2.5}$ impacts should be addressed on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and proximity to off-site receptors, as applicable.[30]
- The Revised Project involves construction of new residential units and recreational facilities and is therefore not a major source of operational TACs and stationary $PM_{2.5}$. BAAQMD thresholds related to siting new sources of TACs and $PM_{2.5}$ near existing or planned sensitive receptors is not applicable
- The Revised Project is a sensitive land use that would warrant an on-site community risk and hazards evaluation. Therefore, the community risk and hazards thresholds for operation of the Revised Project are applicable.

The thresholds identified below are applied to the Revised Project's operational phase (siting new receptors) and construction emissions:

### *Community Risk and Hazards – Project*

Project-level emissions of TACs or $PM_{2.5}$ from individual sources within 1,000 feet of the Revised Project that exceed any of the thresholds listed below are considered a potentially significant community health risk:

- Non-compliance with a qualified Community Risk Reduction Plan;

[27] Bay Area Air Quality Management District, 2011 (revised), California Environmental Quality Act Air Quality Guidelines.
[28] Bay Area Air Quality Management District, 2011 (revised), California Environmental Quality Act Air Quality Guidelines.
[29] Bay Area Air Quality Management District, 2010, Screening Tables for Air Toxics Evaluations during Construction.
[30] Bay Area Air Quality Management District, 2011 (revised), California Environmental Quality Act Air Quality Guidelines.

- An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e. chronic or acute) hazard index greater than 1.0 would be a significant cumulatively considerable contribution;

An incremental increase of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$ from a single source would be a significant cumulatively considerable contribution.[31]

### *Community Risk and Hazards – Cumulative*

Cumulative sources represent the combined total risk values of each of the individual sources within the 1,000-foot evaluation zone. The Revised Project would have a cumulative considerable impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000-foot radius from the fence line of a source or location of a receptor, plus the contribution from the Project, exceeds the following:

- Non-compliance with a qualified Community Risk Reduction Plan; or
- An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- 0.8 $\mu g/m^3$ annual average $PM_{2.5}$.[32]

## 4.2.4 IMPACT DISCUSSION

### Methodology

Criteria air pollutant emissions from construction and operation of the Revised Project were calculated using the California Emissions Estimator Model (CalEEMod), Version 2013.2.2. Transportation emissions are based on trip generation and trip length provided by TJKM. Construction emissions are based on the construction schedule and equipment use provided by the City. The USEPA ISCST3 dispersion modeling program was used to estimate excess lifetime cancer risks and acute and chronic non-cancer hazard indexes at the nearest sensitive receptors.

This section analyzes potential project-specific and cumulative impacts to air quality.

| | |
|---|---|
| **AIR-1** | **The Revised Project would not conflict with or obstruct implementation of the applicable air quality plan.** |

The Revised Project would not exceed the level of population or housing foreseen in City or regional planning efforts; and therefore, would not have the potential to substantially affect housing, employment,

[31] Bay Area Air Quality Management District, 2011 (revised), California Environmental Quality Act Air Quality Guidelines.
[32] Bay Area Air Quality Management District, 2011 (revised), California Environmental Quality Act Air Quality Guidelines.

and population projections within the region, which is the basis of the Bay Area 2010 Climate Action Plan projections. Additionally, the net increase in regional emissions generated by the Revised would not exceed than the BAAQMD's emissions thresholds (see AIR-2). These thresholds are established to identify projects that have the potential to generate a substantial amount of criteria air pollutants. Because the Revised Project would not exceed these thresholds, the Revised Project would not be considered by the BAAQMD to be a substantial emitter of criteria air pollutants. Therefore, the Revised Project would not conflict with or obstruct implementation of the Bay Area 2010 Climate Action Plan and impacts would be considered *less than significant*.

**Applicable Regulations and Conditions of Approval:**

- AB 1493: Pavley Fuel Efficiency Standards
- Title 20 California Code of Regulations (CCR): Appliance Energy Efficiency Standards
- Title 24, Part 6, CCR: Building and Energy Efficiency Standards
- Title 24, Part 11, CCR: Green Building Standards Code
- BAAQMD Regulation 7, Odorous Substances
- BAAQMD Regulation 8, Rule 3, Architectural Coatings
- BAAQMD Regulation 8, Rule 4, General Solvent and Surface Coatings Operations
- BAAQMD Regulation 11, Rule 2, Asbestos, Demolition, Renovation and Manufacturing

**Significance before Mitigation:** Less than significant.

| | |
|---|---|
| **AIR-2** | **The Revised Project would violate an air quality standard or contribute substantially to an existing or projected air quality violation.** |

BAAQMD has identified thresholds of significance for criteria pollutant emissions and criteria air pollutant precursors including, ROG, NOx, $PM_{10}$ and $PM_{2.5}$. Development projects below the significance thresholds are not expected to generate sufficient criteria pollutant emissions to violate any air quality standards or contribute substantially to an existing or projected air quality violation.

## Construction Emissions

Construction activities produce combustion emissions from various sources, such as onsite heavy-duty construction vehicles, vehicles hauling materials to and from the site, and motor vehicles transporting the construction crew. Site preparation activities produce fugitive dust emissions ($PM_{10}$ and $PM_{2.5}$) from demolition and soil-disturbing activities, such as grading and excavation. Air pollutant emissions from construction activities onsite would vary daily as construction activity levels change.

### *Fugitive Dust*

Ground disturbing activities of the Revised Project would generate fugitive dust. Fugitive dust emissions ($PM_{10}$ and $PM_{2.5}$) are considered to be significant unless the Revised Project implements the BAAQMD's Best Management Practices (BMPs) for fugitive dust control during construction. $PM_{10}$ is typically the most significant source of air pollution from the dust generated from construction. The amount of dust generated during construction would be highly variable and is dependent on the amount of material being demolished, the type of material, moisture content, and meteorological conditions. If uncontrolled, $PM_{10}$ and $PM_{2.5}$ levels downwind of actively disturbed areas could possibly exceed State standards. This would be a *significant* impact.

### *Construction Exhaust Emissions*

The Certified EIR identified that the Terraces of Lafayette Project would generate $NO_x$ emissions during construction activities that exceed the BAAQMD's average daily significance thresholds. Mitigation Measures AQ-2a and AQ-2b would reduce regional construction emissions exhaust from on-site off-road equipment and from on-road haul truck trips, respectively. However, the Certified EIR identified that despite mitigation, regional criteria air pollutant emissions from construction of the Terraces of Lafayette Project would remain significant and unavoidable.

Construction emissions of the Revised Project are based on the preliminary construction schedule for the Revised Project and modeled using the California Emissions Estimator Model (CalEEMod), Version 2013.2.2. Construction activities associated with the Revised Project are anticipated to take approximately 30 months. The Revised Project would eliminate the need for soil export because the site would be balanced. To determine potential construction-related air quality impacts, criteria air pollutants generated by Project-related construction activities are compared to the average daily emissions identified in the Certified EIR in Table 4.2-6.

Average daily emissions are based on the annual construction emissions divided by the total number of active construction days.[33] As shown in Table 4.2-6, criteria air pollutant emissions from construction equipment exhaust would not exceed the BAAQMD average daily thresholds. Consequently, construction-related criteria pollutant emissions from exhaust of the Revised Project are *less than significant*.

**Applicable Regulations and Conditions of Approval:**

- CARB Rule 2485 (13 CCR Chapter 10, Section 2485), Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling
- CARB Rule 2449 (13 CCR Chapter 10, Section 2449), In-Use Off-Road Diesel-Fueled Fleets.
- BAAQMD Regulation 11, Rule 2, Asbestos, Demolition, Renovation and Manufacturing

[33] The total number of construction days for the Revised Project is estimated to be 652.

TABLE 4.2-6 REVISED PROJECT CONSTRUCTION-RELATED CRITERIA AIR POLLUTANT EMISSIONS ESTIMATES

| | Revised Project Criteria Air Pollutants (tons/year)[a] | | | |
|---|---|---|---|---|
| Year | ROG | $NO_x$ | Exhaust $PM_{10}$ | Exhaust $PM_{2.5}$ |
| 2015 | 0.86 | 10.36 | 0.44 | 0.40 |
| 2016 | 0.23 | 1.29 | 0.09 | 0.08 |
| 2017 | 1.02 | 1.14 | 0.07 | 0.07 |
| | **Revised Project Criteria Air Pollutants (average lbs/day)[a]** | | | |
| Year | ROG | $NO_x$ | Exhaust $PM_{10}$ | Exhaust $PM_{2.5}$ |
| Revised Project Average Daily Construction Emissions | 6 | 39 | 2 | 2 |
| BAAQMD Average Daily Project-Level Threshold | 54 | 54 | 82 | 54 |
| **Exceeds Average Daily Threshold** | **No** | **No** | **No** | **No** |

Source: CalEEMod 2013.2.2. and Lafayette, City of. 2012, The Terraces of Lafayette Final Environmental Impact Report for the City of Lafayette, State Clearinghouse No. 2011072055, Appendix H, Air Quality & GHG Data and Health Risk Assessment (Annual Emissions), CalEEMod 2011.1.1.
Note: Emissions may not total to 100 percent due to rounding.
a. Construction phasing is based on the preliminary information provided by the City. Where specific information regarding Revised Project-related construction activities was not available, construction assumptions were based on CalEEMod defaults, which are based on construction surveys conducted by South Coast Air Quality Management District of construction equipment and phasing for comparable projects.

**Significance before Mitigation:** Significant.

## Operational Phase

Long-term air pollutant emissions generated by Revised Project would be associated with the burning of fossil fuels in cars (mobile sources); energy use for cooling, heating, and cooking (energy); and landscape equipment, use of consumer products, and fireplace use (area sources). The primary source of long-term criteria air pollutant emissions generated by the Revised Project would be emissions produced from Project-generated vehicle trips. The Revised Project would generate a total 1,224 average daily trips during a weekday and 3,932 average daily trips on the weekend. Due to the mix of uses and trip generation on weekends generated by the park/soccer fields; a quantified analysis was conducted for the Revised Project using CalEEMod, Version 2013.2.2. Table 4.2-7 identifies criteria air pollutant emissions associated with the Revised Project.

TABLE 4.2-7 THE HOMES AT DEER HILL CRITERIA AIR POLLUTANT EMISSIONS FORECAST

| | Criteria Air Pollutants (average lbs/day) | | | |
|---|---|---|---|---|
| Category | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| **Revised Project – The Homes at Deer Hill[a]** | | | | |
| Area | 19 | <1 | <1 | <1 |
| Energy | <1 | <1 | <1 | <1 |
| On-Road Mobile Sources | 5 | 4 | 6 | 2 |
| Total | 24 | 5 | 6 | 2 |
| BAAQMD Average Daily Project-Level Threshold | 54 | 54 | 82 | 54 |
| **Exceeds Average Daily Threshold** | **No** | **No** | **No** | **No** |
| | **Criteria Air Pollutants (tons/year)** | | | |
| Category | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Revised Project Tons per Year (tpy)[a] | 4.45 | 0.84 | 1.13 | 0.31 |
| BAAQMD Annual Project-Level Threshold | 10 tpy | 10 tpy | 15 tpy | 10 tpy |
| **Exceeds Annual Threshold** | **No** | **No** | **No** | **No** |

Note: Emissions may not total to 100 percent due to rounding. New buildings would be constructed to the 2013 Building & Energy Efficiency Standards (effective July 1, 2014). Assumes all fireplaces are gas-burning fireplaces in accordance with BAAQMD Regulation 6, Rule 3.
New buildings would be constructed to the 2013 Building & Energy Efficiency Standards (effective July 1, 2014). Average daily emissions are based on the annual operational emissions divided by 365 days.
Source:
[a] CalEEMod 2013.2.

As shown in Table 4.2-7, the operational emissions generated by the Revised Project would not exceed the BAAQMD daily or annual thresholds. Consequently, the Revised Project would not cumulatively contribute to the nonattainment designations of the Air Basin, and regional operational phase air quality impacts would be *less than significant*.

**Applicable Regulations and Conditions of Approval:**

- AB 1493: Pavley Fuel Efficiency Standards
- Title 20 California Code of Regulations (CCR): Appliance Energy Efficiency Standards
- Title 24, Part 6, CCR: Building and Energy Efficiency Standards
- Title 24, Part 11, CCR: Green Building Standards Code
- BAAQMD Regulation 7, Odorous Substances

**Significance before Mitigation:** Less than significant.

| | |
|---|---|
| **AIR-3** | **The Revised Project would result in a cumulatively considerable net increase of any criteria pollutant for which the project area is in non-attainment under applicable federal or State ambient air quality standards (including releasing emissions that exceed quantitative thresholds for ozone precursors).** |

This section analyzes potential impacts related to air quality that could occur from a combination of the Revised Project with other past, present, and reasonably foreseeable projects within the Air Basin. Any project that produces a significant project-level regional air quality impact in an area that is in nonattainment adds to the cumulative impact. Due to the extent of the area potentially impacted from cumulative project emissions (the Air Basin); a project is cumulatively significant when Project-related emissions exceed the BAAQMD emissions thresholds shown in Table 4.2-5 or exceed the cumulative off-site risk thresholds established by BAAQMD for TAC and $PM_{2.5}$.

The Revised Project would have a significant construction impact for fugitive dust emissions and a less-than-significant operational impact for criteria air pollutants (see AIR-2). Consequently, cumulative criteria air pollutant emissions impacts of the Revised Project are *significant*.

On-site and off-site community risk and hazards of the Revised Project are discussed in Impact AIR-4. The Revised Project would also have a significant cumulative impact associated with on- and off-site community risk and hazards. Therefore, impacts would be *significant*.

**Applicable Regulations and Conditions of Approval:**

- AB 1493: Pavley Fuel Efficiency Standards
- Title 20 CCR: Appliance Energy Efficiency Standards
- Title 24, Part 6, CCR: Building and Energy Efficiency Standards
- Title 24, Part 11, CCR: Green Building Standards Code
- CARB Rule 2449 (13 CCR Chapter 10, Section 2449), In-Use Off-Road Diesel-Fueled Fleets.
- CARB Rule 2485 (13 CCR Chapter 10, Section 2485), Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling
- BAAQMD Regulation 6, Rule 1, General Requirements
- BAAQMD Regulation 8, Rule 3, Architectural Coatings
- BAAQMD Regulation 8, Rule 4, General Solvent and Surface Coatings Operations
- BAAQMD Regulation 11, Rule 2, Asbestos, Demolition, Renovation and Manufacturing

**Significance before Mitigation:** Significant.

| | |
|---|---|
| **AIR-4** | **The Revised Project would expose sensitive receptors to substantial pollutant concentrations.** |

## Off-Site Community Risk and Hazards During Construction

Sensitive land uses in the vicinity of the Revised Project include single-family residential land uses east of Pleasant Hill Road and one residence immediately west of the dog park site; a ranch with outdoor classes and summer camp for children directly north of the Project site across Deer Hill Road (east of the dog park site), a day care center along Stanley Boulevard; and several schools in the area (Acalanes High School, Springhill Elementary School, and Diablo Valley Montessori School). The distances and direction to the sensitive receptors are provided in Table 4.2-4.

The Revised Project has a different construction schedule and includes new project components (i.e., a community park and dog park) than were evaluated in the Certified EIR. Therefore, a construction Health Risk Assessment (HRA) was revised to reflect these changes (see Appendix G of this Draft Supplemental EIR). Construction activities would elevate concentrations of TACs and $PM_{2.5}$ in the vicinity of sensitive land uses. Construction sources evaluated in the HRA include off-road construction equipment (excavators, graders, scrapers, dozers, dump trucks, loaders, rollers, and pavers). In addition, on-road haul trucks, support vehicles (pickups), and workers commuting to the Project site were included in the evaluation. The USEPA ISCST3 dispersion modeling program was used to estimate excess lifetime cancer risks and acute and chronic non-cancer hazard indexes at the nearest sensitive receptors. Results of the analysis are presented in Table 4.2-8.

TABLE 4.2-8 REVISED PROJECT CONSTRUCTION RISK SUMMARY

| | Off-Site Community Risk and Hazards at the Nearest Sensitive Receptor | | | |
|---|---|---|---|---|
| Scenario | Cancer Risk – Adult (per million) | Cancer Risk – Child (per million) | Chronic Hazard (unitless) | $PM_{2.5}$ ($\mu g/m^3$) |
| Revised Project prior to Mitigation | 3.3 | **18** | 0.087 | **0.56** |
| Project Threshold | 10 | 10 | 1.0 | 0.3 |
| **Exceeds Project Threshold Without Mitigation** | **No** | **Yes** | **No** | **Yes** |
| Revised Project with Mitigation | 1.1 | 5.8 | 0.038 | 0.22 |
| **Exceeds Project Threshold With Mitigation** | **No** | **No** | **No** | **No** |

a. At the time of the Certified EIR, age sensitivity factors were not implemented by BAAQMD and the child receptor was not calculated. The maximum exposed sensitive receptors are the residences located east of the Project Site, across Pleasant Hill Road.
Source: Lakes AERMOD View, 8.7, 2014 and Lafayette, City of. 2012, The Terraces of Lafayette Final Environmental Impact Report for the City of Lafayette, State Clearinghouse No. 2011072055.

The results of the Revised Construction HRA, provided in Appendix G, are based on the maximum receptor concentration over the 30-month construction exposure period for off-site receptors, assuming 24-hour outdoor exposure for residents and averaged over a 70-year lifetime. According to the modeling results, the maximum exposed receptors are the off-site residents east of the Project Site, across Pleasant Hill Road. Since the exposure durations for school-based and day care sensitive receptors are lower than the exposure

duration of residential receptors, only the health risk values for the residential receptors are reported in Table 4.2-8. The full results of the Construction HRA can be found in Appendix G.

The results of the HRA indicate that the incremental cancer risk for off-site residents proximate to the Revised Project site during the construction period is 3.3 per million for the adult-scenario and 18 per million for the child scenario. The incremental cancer risk for adult receptors during construction is below the significance threshold but the incremental cancer risk for the child scenario is above the threshold. In addition, $PM_{2.5}$ annual concentrations exceed the BAAQMD significance threshold for off-site residents. For non-carcinogenic effects, the hazard index identified for each toxicological endpoint totaled less than one; and therefore, chronic non-carcinogenic hazards are within acceptable limits. Consequently, the Project would expose sensitive receptors to substantial concentrations of TACs and $PM_{2.5}$ emissions during construction in the absence of mitigation. This would be a *significant* impact.

**Applicable Regulations and Conditions of Approval:**

- CARB Rule 2485 (13 CCR Chapter 10, Section 2485), Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling
- BAAQMD Regulation 8, Rule 3, Architectural Coatings
- BAAQMD Regulation 8, Rule 4, General Solvent and Surface Coatings Operations
- BAAQMD Regulation 11, Rule 2, Asbestos, Demolition, Renovation and Manufacturing

**Significance before Mitigation:** Significant.

## On-Site Community Risk and Hazards

The Revised Project includes a lower residential density than was evaluated in the Certified EIR, but the receptors would still be approximately the same distance from State Highway 24. The Revised Project would also include additional sensitive receptors at the proposed recreational facilities. Therefore, a revised operational HRA was prepared for the Revised Project (see Appendix G of this Draft Supplemental EIR). On-site health risks and hazards imposed by existing sources (e.g., stationary sources and traffic on adjacent streets and freeways) on the sensitive receptors of the Revised Project (i.e., residents in the single-family units and users of the dog park and community park) were evaluated pursuant to BAAQMD's methodology. Sources located within 1,000 feet of the Revised Project are included in BAAQMD's screening thresholds.

Stationary sources near the Revised Project site were identified using BAAQMD's Stationary Source Screening Analysis Tool.[34] Four stationary sources were identified (Shell Gasoline Station, Svensson Automotive, Lafayette Auto Body, Inc., and Penguin Cleaners). Roadways within 1,000 feet of the Revised Project site with over 10,000 average daily traffic trips include State Highway 24, Deer Hill Road, and Pleasant Hill Road. The results of the on-site community risk summary are provided in Table 4.2-9.

[34] BAAQMD Stationary Source Screening Analysis Tool can be accessed from BAAQMD's website at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx

TABLE 4.2-9 ON-SITE COMMUNITY RISK SUMMARY

| | Community Risk and Hazards at On-Site Receptors – Residents[a] | | |
|---|---|---|---|
| Emission Sources | Cancer Risk (per million) | Chronic Hazards | $PM_{2.5}$ |
| Shell Gasoline Station | 8.9 | 0.012 | n/a |
| Svensson Automotive | 0.0 | 0.0 | 0.0 |
| Lafayette Auto Body, Inc. | 0.0 | 0.0 | 0.0 |
| Penguin Cleaners | 7.5 | 0.02 | 0.0 |
| State Route 24 | **41** | 0.039 | **0.38** |
| Pleasant Hill Road | 3.6 | 0.020 | 0.14 |
| Deer Hill Road | 2.4 | 0.020 | 0.09 |
| Threshold | 10 | 1.0 | 0.3 µg/m$^3$ |
| **Exceeds Project Threshold Without Mitigation** | **Yes** | **No** | **Yes** |
| State Route 24 – with Mitigation | 8.7 | 0.01 | 0.17 |
| **Exceeds Project Threshold With Mitigation** | **No** | **No** | **No** |

| | Cumulative Level Risk | | |
|---|---|---|---|
| Emission Sources | Cancer Risk (per million) | Chronic Hazards | $PM_{2.5}$ |
| Total Cumulative Risk – Unmitigated | 63 | 0.11 | 0.61 |
| Total Cumulative Risk – with Mitigation | 31 | 0.08 | 0.39 |
| Threshold | 100 | 100 | 0.8 µg/m$^3$ |
| **Exceeds Cumulative Threshold** | **No** | **No** | **No** |

a. Since the time of the Certified EIR, methodologies evaluating vehicular emission rates have been updated, including CARB's new EMFAC 2011 model and BAAQMD's methodology applying age sensitivity factors to the updated emission factors. Therefore, the results of the HRA now show an exceedance in the excess cancer risk as well as $PM_{2.5}$ concentrations. The maximum exposed sensitive receptors are the residences nearest to State Route 24.
b. Mitigated health risk values for State Route 24 are based on air dispersion modeling results using Lakes AERMOD View, 8.7, 2014, and included MERV10 filters for residential units (based on a modified Mitigation Measure AQ-3 from the Certified EIR). The health risk values for the remaining sources are based on BAAQMD's source screening tools for stationary sources and high volume roadways.

The results of the screening analysis show that all stationary sources and all high volume roadways, except for State Highway 24, are less than the BAAQMD thresholds. Refined analysis using an air dispersion model showed that toxic air contaminants (TACs) and $PM_{2.5}$ concentrations generated from State Route 24 would exceed the BAAQMD significance thresholds, prior to mitigation.[35] This would be a *significant* impact.

[35] The HRA for the Certified EIR reported only a $PM_{2.5}$ exposure concentration over the BAAQMD threshold; the incremental cancer risk was below the threshold. The reason for the difference in the HRA results when compared to the HRA conducted for the Certified EIR is that

Similar to residents of the Revised Project, users of the dog park and community park would be exposed to emissions from State Route 24. While parks are defined as having sensitive receptors, the exposure duration is much less than that of the residential exposure scenario. Assuming recreational use of two hours per day and 100 days per year versus residential exposure of 24 hours per day and 350 days per year, the health risk values for users of the dog park and community park areas were determined for the unmitigated outdoor exposure scenario. For TAC and $PM_{2.5}$ emissions from State Route 24, the incremental cancer risk for users of the parks would be 0.63 in a million. The chronic hazard index would be 0.024 and the $PM_{2.5}$ concentration would be 0.01 $\mu g/m^3$. All of these values are below the BAAQMD significance thresholds. Therefore, users of the dog park and community park portions of the Revised Project would not be exposed to substantial pollutant concentrations.

**Significance before Mitigation:** Significant.

## CO Hotspots

Areas of vehicle congestion have the potential to create pockets of CO called hotspots. These pockets have the potential to exceed the State one-hour standard of 20 parts per million (ppm) or the eight-hour standard of 9.0 ppm. Because CO is produced in the greatest quantities from vehicle combustion and does not readily disperse into the atmosphere, adherence to ambient air quality standards is typically demonstrated through an analysis of localized CO concentrations. Hotspots are typically produced at intersections, where traffic congestion is highest because vehicles queue for longer periods and are subject to reduced speeds.

The Revised Project would generate a total 1,224 average daily trips during a weekday and 3,932 average daily trips on the weekend. The Revised Project would not conflict with CCTA's CMP because it would not hinder the capital improvements outlined in the CMP or alter regional travel patterns. CCTA's CTC's must be consistent with MTC's/ABAG's Plan Bay Area, and an overarching goal of the regional plan is to concentrate development in areas where there are existing services and infrastructure rather than allocate new growth in outlying areas where substantial transportation investments would be necessary to achieve the per capita passenger vehicle VMT and associated GHG emissions reductions. The Revised Project would be consistent with the overall goals of the MTC/ABAG's Plan Bay Area. Furthermore, the Revised Project would not increase traffic volumes at affected intersections by more than 44,000 vehicles per hour or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited. Trips associated with the Revised Project would not exceed the screening criteria of the BAAQMD. Therefore, localized air quality impacts related to mobile-source emissions of the Revised Project would be *less than significant*.

### Applicable Regulations and Conditions of Approval:

- Not Applicable

the assessment methodology has been revised since the Certified EIR. These updates include CARB's updated mobile source emission factor database (EMFAC2011) and BAAQMD's updated methodology applying age sensitivity factors to the EMFAC2011 emission rates to generate a 70-year weighted average emission rates. These methodology changes resulted in an incremental cancer risk, prior to mitigation, of 27 in a million for State Route 24, which exceeds the BAAQMD significance threshold of 10 in a million.

**Significance before Mitigation:** Less than significant.

## 4.2.5 CUMULATIVE IMPACTS

| | |
|---|---|
| **AIR-5** | **Implementation of the Revised Project would cumulatively contribute to air quality impacts in the San Francisco Bay Area Air Basin.** |

The impact discussion under Impact AIR-3 describes the Revised Project's impacts in combination with past, present, and reasonably foreseeable projects. Due to the extent of the area potentially impacted from cumulative project emissions (the Air Basin); a project is cumulatively significant when Project-related emissions exceed the BAAQMD emissions thresholds (shown in Table 4.2-5) or exceed the cumulative off-site risk thresholds established by BAAQMD for TAC and $PM_{2.5}$.

The Revised Project would have a significant construction impact associated with fugitive dust (see Impact AIR-2). Consequently, cumulative criteria air pollutant emissions impacts of the Revised Project are *significant*.

On-site and off-site community risk and hazards of the Revised Project are discussed in Impact AIR-4. The Revised Project would also have a significant cumulative impact associated with on- and off-site community risk and hazards. Therefore, cumulative TAC and $PM_{2.5}$ impacts would be *significant*.

**Applicable Regulations and Conditions of Approval:**

- AB 1493: Pavley Fuel Efficiency Standards
- Title 20 California Code of Regulations (CCR): Appliance Energy Efficiency Standards
- Title 24, Part 6, CCR: Building and Energy Efficiency Standards
- Title 24, Part 11, CCR: Green Building Standards Code
- BAAQMD Regulation 7, Odorous Substances
- BAAQMD Regulation 8, Rule 3, Architectural Coatings
- BAAQMD Regulation 8, Rule 4, General Solvent and Surface Coatings Operations
- BAAQMD Regulation 11, Rule 2, Asbestos, Demolition, Renovation and Manufacturing

**Significance before Mitigation:** Significant.

## 4.2.6 SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

The Revised Project would result in the following air quality significant impacts. These impacts would be mitigated to less-than-significant levels with the implementation of the following mitigation measures

included in the Certified EIR. Modifications to the Certified EIR mitigation measures are identified in ~~strikeout text~~ to indicate deletions and <u>underlined text</u> to signify additions.

**AIR-1: Grading and other ground-disturbing activities would produce fugitive dust, which could add to the amount of airborne particulates and contribute to the nonattainment designation of the Air Basin.**

**Mitigation Measure AQ-1:** The Project shall comply with the following BAAQMD Basic Control Measures for reducing construction emissions of $PM_{10}$:

- Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 24 inches of freeboard (i.e. the minimum required space between the top of the load and the top of the trailer).
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep streets (with water sweepers using reclaimed water if possible) at the end of each day if visible soil material is carried onto adjacent paved roads.
- Suspend ground-disturbing activities when wind speeds exceed 25 mile per hour.
- Install three-sided enclosures for storage piles on-site for more than five days. The enclosures shall be designed with a maximum 50 percent porosity.

**Significance after Mitigation:** Less than significant.

**AIR-2: Without the use of Tier 3 construction equipment during the construction period, the Project could pose a risk to nearby off-site receptors, which would be a *significant* impact.**

**Mitigation Measure AQ-2~~a~~:** The construction contractor shall implement the following measures to reduce off-road exhaust emissions during grading and construction activities. To assure compliance, the City of Lafayette shall verify that these measures have been implemented during normal construction site inspections:

- Large off-road construction equipment with horsepower (hp) ratings of 50 hp or higher shall meet the United States Environmental Protection Agency-Certified emission standard for Tier 3 off-road equipment or higher. Tier 3 engines between 50 and 750 horsepower are available for 2006 to 2008

model years and Tier 4 equipment was phased in for off-road fleets between 2008 and 2014 and may be available. A list of construction equipment by type and model year shall be maintained by the construction contractor on-site.

- All construction equipment shall be properly serviced and maintained to the manufacturer's standards to reduce operational emissions.
- Non-essential idling of construction equipment shall be limited to no more than five consecutive minutes.
- Construction activities that require use of large off-road equipment (50 hp or greater) shall be suspended on "Spare the Air" days.

**Significance after Mitigation:** Less than significant.

**AIR-3: Results of the community risk assessment indicate that the incremental cancer risk and average annual $PM_{2.5}$ concentration for a maximally exposed on-site receptor would exceed the BAAQMD significance thresholds.**

**Mitigation Measure AQ-3:** The applicant shall install high efficiency Minimum Efficiency Reporting Value (MERV) filters with a rating of 10 ~~9 to 12~~ in the intake of the residential ventilation systems. MERV 10 ~~9 to 12~~ filters have a Particle Size Efficiency Rating that results in an average 57.5 ~~40 percent up to 80~~ percent reduction of particulates in the 1.0 to 3.0 micron range, which includes diesel particulate matter (DPM) and $PM_{2.5}$. To ensure long-term maintenance and replacement of the MERV filters in the individual units, the owner/property manager shall maintain and replace the MERV 10 ~~9 to 12~~ filters in accordance with the manufacturer's recommendations, which typically is after two to three months. The developer, sales, and/or rental representative also shall provide notification to all affected tenants/residents of the potential health risk from State Highway 24 and shall inform ~~renters~~ residents of increased risk of exposure to DPM and $PM_{2.5}$ from State Highway 24 when the windows are open.

**Significance after Mitigation:** Less than significant.

With implementation of the Mitigation Measures AQ-1, AQ-2~~a~~, and AQ-3 from the Certified EIR, as modified above, the Revised Project would not result in any significant project-specific or cumulative impacts to air quality and therefore no new mitigation measures are required.