4.2 AIR QUALITY

This section of the Environmental Impact Report (EIR) provides a discussion of existing air quality, evaluates potential air quality impacts associated with the proposed project, and identifies mitigation measures recommended for potentially significant adverse impacts. Air quality modeling data and assumptions that are used for quantifying the proposed project's emissions are based on the following sources. The air quality data and calculations are included in Appendix C to this EIR.

- Bay Area Quality Management District.
- California Air Resources Board.
- Air Quality and GHG Data.

4.2.1 ENVIRONMENTAL SETTING

CLIMATE AND METEOROLOGY

The California Air Resources Board (CARB) divides the State into 15 air basins that share similar meteorological and topographical features. The proposed project is located within the San Francisco Bay Area Air Basin (Basin). This Basin 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 such natural factors as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions. These factors along with applicable regulations are discussed below.

The proposed project is in southern Solano County, which falls within the San Francisco Bay Area Air Basin and is within the jurisdictional boundaries of the Bay Area Air Quality Management District (BAAQMD). The Basin consists of a mountain range, inland valleys, and bays that distort wind flow patterns. The Coast Range splits the Bay Area, creating a western coast gap, the Golden Gate, and the 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 location and strength of a semi-permanent, subtropical high-pressure cell. In the summer, the Pacific 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 coast which results in condensation and the presence of fog and stratus clouds along the coast. In the winter, the high-pressure cell weakens and shifts southward, resulting in increased wind flow offshore, the absence of

upwelling, and the occurrence of storms. As noted in the City of Vallejo General Plan EIR, these weak inversions coupled with moderate winds result in a low air-pollution potential.[1]

The Basin is characterized by moderately wet winters (November through March) and dry summers. The rainfall in the mountains reaches 40 inches, while the lower elevations in the valleys often receive less than 16 inches. The temperature at the coast in the summer afternoons can be 35 degrees Fahrenheit cooler than the temperature 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.

Climate, or the average weather condition, affects air quality in several ways. Wind patterns can remove or add air pollutants emitted by stationary or mobile sources. Inversion, a condition where warm air traps cooler air underneath it, can hold pollutants near the ground by limiting upward mixing (dilution). Topography also affects the local climate, as valleys often trap emissions by limiting lateral dispersal.

The inversions typical of winter, called radiation inversions, are formed as heat quickly radiates from the earth's surface after sunset, causing the air in contact with it to rapidly cool. Radiation inversions are strongest on clear, low-wind, cold winter nights, allowing the build-up of such pollutants as carbon monoxide and particulate matter. When wind speeds are low, there is little mechanical turbulence to mix the air, resulting in a layer of warm air over a layer of cooler air next to the ground. Mixing depths under these conditions can be as shallow as 50 to 100 meters, particularly in rural areas. Urban areas usually have deeper minimum mixing layers because of heat island effects and increased surface roughness. During radiation inversions downwind transport is slow, the mixing depths are shallow, and turbulence is minimal, all factors which contribute to ozone formation.

Although each type of inversion is most common during a specific season, either inversion mechanism can occur at any time of the year. Sometimes both occur simultaneously. Moreover, the characteristics of an inversion often change throughout the course of a day. The terrain of the Basin also induces significant variations among subregions.

The frequency of hot, sunny days during the summer months in the Basin is another important factor that affects air pollution potential. It is at the higher temperatures that ozone is formed. In the presence of ultraviolet sunlight and warm temperatures, reactive organic gases and oxides of nitrogen react to form secondary photochemical pollutants, including ozone.

Because temperatures in many of the Basin inland valleys are so much higher than near the coast, the inland areas are especially prone to photochemical air pollution. In late fall and winter, solar angles are low, resulting in insufficient ultraviolet light and warming of the atmosphere to drive the photochemical reactions. Ozone concentrations do not reach significant levels in the Basin during these seasons.

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

Although air pollution potential is strongly influenced by climate and topography, air pollution that occurs in a location also depends upon the amount of air pollutant emissions in the surrounding area or transported from more distant places. Air pollutant emissions generally are highest in areas that have high population densities, high motor vehicle use, and/or industrialization. These contaminants created by photochemical processes in the atmosphere, such as ozone, may result in high concentrations many miles downwind from the sources of their precursor chemicals.

AIR POLLUTANTS OF CONCERN

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and State laws. These regulated air pollutants are known as "criteria air pollutants" and are categorized into primary and secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Primary air pollutants include carbon monoxide (CO), reactive organic gases (ROG), nitrogen oxide (NO_X), sulfur dioxide (SO_2), coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$), lead, and fugitive dust. Of these, CO, NO_X, SO_2, PM_{10}, and $PM_{2.5}$ are criteria pollutants. ROG and NO_X are criteria pollutant precursors and go on to form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone (O_3) and nitrogen dioxide (NO_2) are the principal secondary criteria pollutants. *Table 4.2-1: Air Contaminants and Associated Public Health Concerns*, provides a description of each of the criteria air pollutants and their known health effects.

Table 4.2-1: Air Contaminants and Associated Public Health Concerns

Pollutant	Major Anthropogenic Sources	Human Health Effects
Particulate Matter (PM_{10} and $PM_{2.5}$)	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; asthma; chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility.
Ozone (O_3)	Formed by a chemical reaction between reactive organic gases/volatile organic compounds (ROG or VOC)[1] and nitrogen oxides (NO_X) in the presence of sunlight. Motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield.
Sulfur Dioxide (SO_2)	A colorless gas formed when fuel containing sulfur is burned and when gasoline is extracted from oil. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.

Pollutant	Major Anthropogenic Sources	Human Health Effects
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include motor vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone. Contributes to global warming and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere.
Lead	Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. Due to the phase out of leaded gasoline, metals processing is the major source of lead emissions to the air today. 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.	Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children, resulting in learning deficits and lowered IQ.

Source: California Air Pollution Control Officers Association, Health Effects, http://www.capcoa.org/health-effects/, Accessed January 16, 2019.

Notes:

1. Volatile Organic Compounds (VOCs or Reactive Organic Gases [ROG]) are hydrocarbons/organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including ROGs and VOCs. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants; other common sources are petroleum fuels, solvents, dry cleaning solutions, and paint (via evaporation).

Ozone, or smog, is not emitted directly into the environment, but is formed in the atmosphere by complex chemical reactions between ROG and NO_X in the presence of sunlight. Ozone formation is greatest on warm, windless, sunny days. The main sources of NO_X and ROG, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) the evaporation of solvents, paints, and fuels, and biogenic sources. Automobiles are the single largest source of ozone precursors in the Basin. Tailpipe emissions of ROG are highest during cold starts, hard acceleration, stop-and-go conditions, and slow speeds. They decline as speeds increase up to about 50 miles per hour (mph), then increase again at high speeds and high engine loads. ROG emissions associated with evaporation of unburned fuel depend on vehicle and ambient temperature cycles. Nitrogen oxide emissions exhibit a different curve; emissions decrease as the vehicle approaches 30 mph and then begins to increase with increasing speeds.

Ozone levels usually build up during the day and peak in the afternoon hours. 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. Ozone can also damage plants and trees, and materials such as rubber and fabrics.

TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes more than 200 compounds, including particulate emissions from diesel-fueled engines.

CARB has identified diesel particulate matter (DPM) as a toxic air contaminant. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances produced when an engine burns diesel fuel. DPM is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine. Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-headedness, and nausea. DPM poses the greatest health risk among the TACs. Almost all diesel exhaust particle mass 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 lung.

AMBIENT AIR QUALITY

CARB monitors ambient air quality at approximately 250 air monitoring stations across the state. Air quality monitoring stations usually measure pollutant concentrations ten feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The closest air monitoring station to the proposed project is the Vallejo – Tuolumne Street Monitoring Station located approximately two miles south of the project site. The second monitoring station, San Pablo-Rumrill Boulevard, is located approximately 14 miles southwest of the project site. Local air quality data from 2016 to 2018 are provided in *Table 4.2-2: Local Air Quality Levels*. This table lists the monitored maximum concentrations and number of exceedances of federal/state air quality standards for each year.

Table 4.2-2: Local Air Quality Levels

Pollutant	Vallejo-304 Tuolumne Street[1]			San Pablo- Rumrill Blvd[2]		
	2016	2017	2018	2016	2017	2018
Ozone (O_3)						
1-hour Maximum Concentration (ppm)	0.097	0.105	0.070	0.094	0.104	0.061
8-hour Maximum Concentration (ppm)	0.072	0.088	0.055	0.061	0.080	0.052
Number of Days Standard Exceeded						
CAAQS 1-hour (>0.09 ppm)	1	1	0	0	3	0
NAAQS 8-hour (>0.070 ppm)	1	2	0	0	2	0
Carbon Monoxide (CO)						
1-hour Maximum Concentration (ppm)	1.896	3.048	2.757	1.749	2.481	1.882

Pollutant	Vallejo-304 Tuolumne Street[1]			San Pablo- Rumrill Blvd[2]		
	2016	2017	2018	2016	2017	2018
Number of Days Standard Exceeded						
NAAQS 1-hour (>35 ppm)	0	0	0	0	0	0
CAAQS 1-hour (>20 ppm)	0	0	0	0	0	0
Nitrogen Dioxide (NO_2)						
1-hour Maximum Concentration (ppm)	0.0433	0.0492	0.0574	0.0392	0.0476	0.060
Number of Days Standard Exceeded						
NAAQS 1-hour (>100 ppm)	0	0	0	0	0	0
CAAQS 1-hour (>0.18 ppm)	0	0	0	0	0	0
Particulate Matter Less Than 10 Microns (PM_{10})						
National 24-hour Maximum Concentration	-*--	-*-	-*-	33.0	95.3	191.1
State 24-hour Maximum Concentration	-*-	-*-	-*-	34.0	95.0	201.0
State Annual Average Concentration (CAAQS=20 µg/m^3)	-*-	-*-	-*-	15.2	20.4	19.9
Number of Days Standard Exceeded						
NAAQS 24-hour (>150 µg/m^3)	-*-	-*-	-*-	0	0	1
CAAQS 24-hour (>50 µg/m^3)	-*-	-*-	-*-	0	4	2
Particulate Matter Less Than 2.5 Microns ($PM_{2.5}$)						
National 24-hour Maximum Concentration	23.0	101.9	197.2	19.5	71.2	195.4
State 24-hour Maximum Concentration	23.0	101.9	197.2	19.5	71.2	195.4
Number of Days Standard Exceeded						
NAAQS 24-hour (>35 µg/m^3)	0	9	13	0	9	14

NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards; ppm = parts per million; µg/m^3 = micrograms per cubic meter

1. Measurements taken at the Vallejo Monitoring Station located at 304 Tuolumne Street, Vallejo CA 94590 (CARB# 48879).
2. Measurements taken at the San Pablo- Rumrill Boulevard Monitoring Station located at 1865 Rumrill Boulevard, San Pablo, California 94806 (CARB #07447).

*There was insufficient (or no) data available to determine the value.

Source: All pollutant measurements are from the California Air Resources Board Aerometric Data Analysis and Management system (iADAM) database (https://www.arb.ca.gov/adam) except for CO, which were retrieved from the California Air Resources Board Air Quality and Meteorological Information System (AQMIS) (https://www.arb.ca.gov/aqmis2/aqdselect.php).

SENSITIVE RECEPTORS

Sensitive populations are more susceptible to the effects of air pollution than the general population. Sensitive populations (sensitive receptors) that are in proximity to localized sources of toxics and CO are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Refer to *Table 4.2-3: Sensitive Receptors* for project-specific sensitive receptors. The nearest sensitive receptors to the project site are single-family and multi-family residences located adjacent to the eastern and southern boundaries of the project site, respectively. Other sensitive receptors are located less than 0.1 mile from the project's boundary.

Table 4.2-3: Sensitive Receptors

Receptor Type/Description	Distance and Direction from the Project Site[1]
Single-family residences	96 feet east
Multi-family residences	150 feet south
Day Care	450 feet south
Cooper Elementary School	0.6 miles west
Hanns Park	1 mile south

[1] Distance calculated from property line of proposed project site and property line of the sensitive receptors

4.2.2 REGULATORY SETTING

FEDERAL

Federal Clean Air Act

Air quality is federally protected by the Clean Air Act and its amendments. Under the Federal Clean Air Act (FCAA), the U.S. Environmental Protection Agency (U.S. EPA) developed the primary and secondary National Ambient Air Quality Standards (NAAQS) for the criteria air pollutants including ozone, NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, and lead. Proposed projects in or near nonattainment areas could be subject to more stringent air-permitting requirements. The FCAA requires each state to prepare a State Implementation Plan (SIP) to demonstrate how it will attain the NAAQS within the federally imposed deadlines.

The U.S. EPA can withhold certain transportation funds from states that fail to comply with the planning requirements of the FCAA. If a state fails to correct these planning deficiencies within two years of federal notification, the U.S. EPA is required to develop a federal implementation plan for the identified nonattainment area or areas. The U.S. EPA has delegated enforcement of air pollution control regulations to the individual states. BAAQMD attainment status with respect to federal standards is summarized in *Table 4.2-4: State and Federal Ambient Air Quality Standards*.

Table 4.2-4: State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standards[1]		Federal Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
Ozone (O_3)	8 Hour	0.070 ppm (137 µg/m^3)	N[9]	0.070 ppm	N[4]
	1 Hour	0.09 ppm (180 µg/m^3)	N	NA	N/A[5]
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	A	9 ppm (10 mg/m^3)	A
	1 Hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	A[6]

Pollutant	Averaging Time	State Standards[1]		Federal Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m^3)	A	0.10 ppm[11]	U
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	-	0.053 ppm (100 µg/m^3)	A
Sulfur Dioxide[12] (SO_2)	24 Hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	A
	1 Hour	0.25 ppm (655 µg/m^3)	A	0.075 ppm (196 µg/m^3)	A
	Annual Arithmetic Mean	NA	-	0.03 ppm (80 µg/m^3)	A
Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	N	150 µg/m^3	-
	Annual Arithmetic Mean	20 µg/m^3	N[7]	NA	U
Fine Particulate Matter ($PM_{2.5}$) [15]	24-Hour	NA	-	35 µg/m^3	U/A
	Annual Arithmetic Mean	12 µg/m^3	N[7]	12 µg/m^3	N
Sulfates (SO_{4-2})	24 Hour	25 µg/m^3	A	NA	-
Lead (Pb)[13, 14]	30-Day Average	1.5 µg/m^3	-	NA	A
	Calendar Quarter	NA	-	1.5 µg/m^3	A
	Rolling 3-Month Average	NA	-	0.15 µg/m^3	-
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (0.15 µg/m^3)	U	NA	-
Vinyl Chloride (C_2H_3Cl)	24 Hour	0.01 ppm (26 µg/m^3)	-	NA	-
Visibility Reducing Particles[8]	8 Hour (10:00 to 18:00 PST)	-	U	-	-

A = attainment; N = nonattainment; U = unclassified; N/A = not applicable or no applicable standard; ppm = parts per million; µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; – = not indicated or no information available.

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.
2. National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.070 ppm (70 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m_3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m^3.
   Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every

Pollutant	Averaging Time	State Standards[1]		Federal Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status

site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

3. National air quality standards are set by the EPA at levels determined to be protective of public health with an adequate margin of safety.
4. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour ozone concentration per year, averaged over three years, is equal to or less than 0.070 ppm. EPA will make recommendations on attainment designations by October 1, 2016, and issue final designations October 1, 2017. Nonattainment areas will have until 2020 to late 2037 to meet the health standard, with attainment dates varying based on the ozone level in the area.
5. The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005.
6. In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.
7 In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.
8 Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.
9. The 8-hour CA ozone standard was approved by the Air Resources Board on April 28, 2005 and became effective on May 17, 2006.
10. On January 9, 2013, EPA issued a final rule to determine that the Bay Area attains the 24-hour $PM_{2.5}$ national standard. This EPA rule suspends key SIP requirements as long as monitoring data continues to show that the Bay Area attains the standard. Despite this EPA action, the Bay Area will continue to be designated as "non-attainment" for the national 24-hour $PM_{2.5}$ standard until such time as the Air District submits a "redesignation request" and a "maintenance plan" to EPA, and EPA approves the proposed redesignation.
11. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100ppm (effective January 22, 2010). The US Environmental Protection Agency (EPA) expects to make a designation for the Bay Area by the end of 2017.
12. On June 2, 2010, the U.S. EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS however must continue to be used until one year following U.S. EPA initial designations of the new 1-hour SO_2 NAAQS.
13. CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure below which there are no adverse health effects determined.
14. National lead standard, rolling 3-month average: final rule signed October 15, 2008. Final designations effective December 31, 2011.
15. In December 2012, EPA strengthened the annual $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) from 15.0 to 12.0 micrograms per cubic meter ($\mu g/m^3$). In December 2014, EPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated "unclassifiable/attainment" must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard is April 15, 2015.

Source: Bay Area Air Quality Management District, *Air Quality Standards and Attainment Status*, http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status, accessed January 21, 2019.

STATE

California Air Resources Board

CARB administers the air quality policy in California. The California Ambient Air Quality Standards (CAAQS) were established in 1969 pursuant to the Mulford-Carrell Act. These standards, included with the NAAQS (Table 4.2-3), are generally more stringent and apply to more pollutants than the NAAQS. In addition to the criteria pollutants, CAAQS have been established for visibility reducing particulates, hydrogen sulfide, and sulfates.

The California Clean Air Act (CCAA), which was approved in 1988, requires that each local air district prepare and maintain an Air Quality Management Plan (AQMP) to achieve compliance with CAAQS. These AQMPs also serve as the basis for the preparation of the State Implementation Plans (SIP) for meeting federal clean air standards for the State of California. Like the U.S. EPA, CARB also designates areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a state standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events such as wildfires, volcanoes, etc. are not considered violations of a State standard, and are not used as a basis for designating areas as nonattainment. The Basin attainment status with respect to State standards is summarized in Table 4.2-4.

REGIONAL

Bay Area Air Quality Management District

BAAQMD is the regional agency with jurisdiction over the nine-county region located in the Basin. The Association of Bay Area Governments (ABAG), Metropolitan Transportation Commission (MTC), county transportation agencies, cities and counties, and various non-governmental organizations also join in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs.

As identified in Table 4.2-4, in general, the Bay Area experiences low concentrations of most pollutants when compared to federal standards, except for O_3 and particulate matter (PM), for which standards are exceeded periodically. With respect to federal standards, the Bay Area's attainment status for 8-hour ozone is classified as "marginal nonattainment" and "nonattainment" for $PM_{2.5}$. As a designated "marginal" nonattainment area for the federal 8-hour ozone standard, the preparation of a SIP is currently not required. However, in response to the U.S. EPA's designation of the Basin for the previous nonattainment 8-hour federal ozone standard, BAAQMD, ABAG, and MTC were required to develop an ozone attainment plan to meet this standard. The 1999 Ozone Attainment Plan was prepared and adopted by these agencies in June 1999 and this federal plan was updated in 2001. The most recent State ozone plan is the Bay Area 2017 Clean Air Plan. The Clean Air Plan was developed as a multi-pollutant plan that provides an integrated control strategy to reduce ozone, PM, toxic air contaminants, and greenhouse gases (GHGs). In 1998, after many years without violations of any CO standards, the attainment status for CO was upgraded to "attainment."

The Basin's nonattainment status is attributed to the region's development history. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards.[2]

[2] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, page 2-1, May 2017.

Under CEQA, BAAQMD is a commenting responsible agency on air quality within its jurisdiction or impacting its jurisdiction. BAAQMD reviews projects to ensure that they would: (1) support the primary goals of the latest Air Quality Plan; (2) include applicable control measures from the Air Quality Plan; and (3) not disrupt or hinder implementation of any Air Quality Plan control measures.

In May 2010, BAAQMD adopted its updated CEQA Air Quality Guidelines as a guidance document to provide lead government agencies, consultants, and project proponents with uniform procedures for assessing air quality impacts and preparing the air quality sections of environmental documents for projects subject to CEQA. BAAQMD CEQA Air Quality Guidelines include methodologies and thresholds for addressing project and program level air quality and GHG emissions. The CEQA Air Quality Guidelines were called into question by an order issued March 5, 2012, in *California Building Industry Association (CBIA) v. BAAQMD* (Alameda Superior Court Case No. RGI0548693). The Alameda County Superior Court issued a judgment finding that BAAQMD had failed to comply with CEQA when it adopted the thresholds. The court issued a writ of mandate ordering BAAQMD to set aside the thresholds and cease dissemination of them until BAAQMD had complied with CEQA. Notably, the court's ruling was based solely on BAAQMD's failure to comply with CEQA. The court did not reach any issues relating to the validity of the scientific reasoning underlying the recommended significance thresholds.

In August 2013, the Appellate Court struck down the lower court's order to set aside the thresholds. CBIA sought review by the California Supreme Court on three issues, including the Appellate Court's decision to uphold BAAQMD's adoption of the thresholds. The Supreme Court granted review on just one issue: Under what circumstances, if any, does CEQA require an analysis of how existing environmental conditions will impact future residents or users of a proposed project? In December 2015, the California Supreme Court confirmed that CEQA, with several specific exceptions, is concerned with the impacts of a project on the environment, not the effects the existing environment may have on a project. BAAQMD published a new version of its Guidelines dated May 2017, which includes revisions made to address the Supreme Court's opinion. BAAQMD is currently working on revising any outdated information in the Guidelines as part of its update to the State CEQA Guidelines and thresholds of significance.

CARE Program

BAAQMD initiated the Community Air Risk Evaluation (CARE) program in 2004, which evaluates and reduces health risks associated with exposures to outdoor TACs in the Bay Area. The program examines TAC emissions from point sources, area sources, and on-road and off-road mobile sources with an emphasis on diesel exhaust. The CARE program is ongoing and encourages community involvement and input. The technical analysis portion of the CARE program is being implemented in three phases that include an assessment of the sources of TAC emissions, modeling, and measurement programs to estimate concentrations of TACs, and an assessment of exposures and health risks. Throughout the program, information derived from the technical analyses will be used to focus emission reduction measures in areas with high TAC exposures and a high density of sensitive populations. Risk reduction activities associated with the CARE program are focused on the most at-risk communities in the Bay Area. BAAQMD has identified six affected communities, including Vallejo, as in need of immediate action. In

2013, Vallejo was identified as an impacted community by the CARE program. These are areas with high concentrations of air pollution and populations most vulnerable to air pollution's health impacts.

For commercial and industrial sources, BAAQMD regulates TACs using a risk-based approach. This approach uses a health risk assessment to determine what sources and pollutants to control as well as the degree of control. A health risk assessment is an analysis in which human health exposure to toxic substances is estimated and considered together with information regarding the toxic potency of the substances, in order to provide a quantitative estimate of health risks. As part of ongoing efforts to identify and assess potential health risks to the public, BAAQMD has collected and compiled air toxics emissions data from industrial and commercial sources of air pollution throughout the Bay Area.

Air Quality Management Plan

Air quality plans developed to meet federal requirements are referred to as State Implementation Plans (SIP). The federal and state Clean Air Acts require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM_{10} standard). BAAQMD is responsible for developing a Clean Air Plan, which guides the region's air quality planning efforts to attain the CAAQS. BAAQMD adopted the *2017 Clean Air Plan: Spare the Air, Cool the Climate* on April 19, 2017.

The 2017 Clean Air Plan provides a regional strategy to protect public health and protect the climate. To protect public health, the plan describes how BAAQMD will continue progress toward attaining all State and federal air quality standards and eliminating health risk disparities from exposure to air pollution among Bay Area communities. To protect the climate, the 2017 Clean Air Plan defines a vision for transitioning the region to a post-carbon economy needed to achieve ambitious GHG reduction targets for 2030 and 2050 and provides a regional climate protection strategy that will put the Bay Area on a pathway to achieve those GHG reduction targets. The 2017 Clean Air Plan contains district-wide control measures to reduce ozone precursor emissions (i.e., ROG and NO_X), particulate matter, TACs, and GHG emissions. The Bay Area 2017 Clean Air Plan updates the Bay Area 2010 Clean Air Plan in accordance with the requirements of the CCAA to implement "all feasible measures" to reduce ozone; provides a control strategy to reduce ozone, PM, TACs, and greenhouse gases in a single, integrated plan; reviews progress in improving air quality in recent years; and establishes emission control measures to be adopted or implemented in both the short term and through 2050.

The 2017 Clean Air Plan includes a wide range of control measures designed to decrease emissions of the air pollutants that are most harmful to Bay Area residents, such as particulate matter, ozone, and toxic air contaminants; to reduce emissions of methane and other "super-GHGs" that are potent climate pollutants in the near-term; and to decrease emissions of carbon dioxide by reducing fossil fuel combustion.

The following BAAQMD rules would limit emissions of air pollutants from construction and operation of the project:

Regulation 6, Rule 3. Wood-Burning Devices. The purpose of this rule is to limit emissions of particulate matter and visible emissions from wood-burning devices used for primary heat, supplemental heat or ambiance.

Regulation 8, Rule 3. Architectural Coatings. This rule governs the manufacture, distribution, and sale of architectural coatings and limits the reactive organic gases content in paints and paint solvents. Although this rule does not directly apply to the project, it does dictate the ROG content of paint available for use during the construction.

Regulation 8, Rule 15. Emulsified and Liquid Asphalts. This rule dictates the reactive organic gases content of asphalt available for use during construction through regulating the sale and use of asphalt and limits the ROG content in asphalt. Although this rule does not directly apply to the project, it does dictate the ROG content of asphalt for use during the construction.

Regulation 9, Rule 8. Organic Compounds. This rule limits the emissions of nitrogen oxides and carbon monoxide from stationary internal combustion engines with an output rated by the manufacturer at more than 50 brake horsepower.

BAAQMD prepared an Ozone Attainment Demonstration Plan to satisfy the federal 1-hour ozone planning requirement because of the Air Basin's nonattainment for federal and State ozone standards. The U.S. EPA revoked the 1-hour ozone standard and adopted an 8-hour ozone standard.

LOCAL

Propel Vallejo General Plan 2040

The Propel Vallejo General Plan 2040 (City of Vallejo, 2017) Healthy Environment section provides guidance in land use and development policies for implementation by BAAQMD. The following General Plan policies are applicable to the proposed project:

Goal CP-1 Healthy Communities:	Promote the health of all Vallejoans.
Policy CP-1.12. Clean Air.	Protect the community from harmful levels of air pollution.
Action CP-1.12A	Convert the City fleet of street sweepers and other large-scale equipment from fossil fuel to alternative fuel types, and work with service providers to convert refuse and recycling trucks to alternative fuels, in conformance with Bay Area Air Quality Management District (BAAQMD) requirements for fleets.
Action CP-1.12B	Update City regulations to set BAAQMD-recommended limits for particulate emissions from construction, demolition, debris hauling, and utility maintenance.
Action CP-1.12C	Provide information regarding advances in air-quality protection measures to schools, homeowners, and operators of "sensitive receptors" such as senior and child care facilities.

Action CP-1.12D	Periodically review and update City regulations to comply with changes in State law and BAAQMD Guidelines pertaining to coal and wood-burning devices.
Action CP-1.12E	Periodically review the Building Code for consistency with the latest California Green Building Standards Code, and assess the need for updates to require new construction and remodels to employ best practices and materials to reduce emissions, both during and after construction.
Action CP-1.12F	Update City regulations to prohibit grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour, or require the use of water trucks to wet soil.

City of Vallejo Municipal Code

The City of Vallejo Municipal Code contains all ordinances for the City. The Municipal Code is organized by Title, Chapter, and Section. Title 16 of the Municipal Code is the City's Zoning Ordinance, which, among other purposes, is intended to assure the orderly and beneficial development of the City, attain a desirable balance of residential and employment opportunities, and promote efficient urban design and arrangement. Specifically related to air quality, Chapter 16.72.070 – Air pollution performance standards states that all uses shall comply with current BAAQMD regulations.

4.2.3 STANDARDS OF SIGNIFICANCE

SIGNIFICANCE CRITERIA AND THRESHOLDS

Based upon the criteria derived from Appendix G of the State CEQA Guidelines, a project normally would have a significant effect on the environment if it would:

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

BAAQMD Thresholds

BAAQMD's CEQA Air Quality Guidelines provide significance thresholds for both construction and operation of projects. If BAAQMD thresholds are exceeded, a potentially significant impact could result. However, ultimately the lead agency determines the thresholds of significance for impacts. If a project proposes development in excess of the established thresholds, as identified in *Table 4.2-5: Bay Area Air*

Quality Management District Emissions Thresholds, a significant air quality impact may occur and additional analysis is warranted to fully assess the significance of impacts.

Table 4.2-5: Bay Area Air Quality Management District Emissions Thresholds

Criteria Air Pollutants and Precursors (Regional)	Construction-Related	Operational-Related	
	Average Daily Emissions (pounds/day)	Average Daily Emission (pounds/day)	Annual Average Emissions (tons/year)
ROG	54	54	10
NO_X	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
$PM_{10}/PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average 20.0 ppm (1-hour average)	

Source: Bay Area Air Quality Management District, *2017 CEQA Air Quality Guidelines,* 2017.

It should be noted that a quantitative CO impact analysis is required by BAAQMD (comparing project emissions to the CAAQS), if none of the following are met:

- Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
- The project traffic 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 intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

Cumulative Emissions Thresholds

BAAQMD's 2017 Clean Air Plan was prepared to accommodate growth, meet State and federal air quality standards, and minimize the fiscal impact that pollution control measures have on the local economy. According to BAAQMD CEQA Air Quality Guidelines, project-related emissions that fall below the established construction and operational thresholds should be considered less than significant unless there is pertinent information to the contrary. If a project exceeds these emission thresholds, BAAQMD CEQA Air Quality Guidelines states that the significance of a project's contribution to cumulative impacts should be determined based on whether the rate of growth in average daily trips exceeds the rate of growth in population.

Methodology

This air quality impact analysis considers construction and operational impacts associated with the proposed project. Construction equipment, trucks, worker vehicles, and ground-disturbing activities

associated with proposed project construction would generate emissions of criteria air pollutants and precursors. Construction-related and operational emissions are evaluated consistent with methodologies outlined in BAAQMD CEQA Air Quality Guidelines for assessing and mitigating air quality impacts. The proposed project's construction-related exhaust emissions are compared to the daily criteria pollutant emissions significance thresholds in order to determine the significance of a project's impact on regional air quality.

BAAQMD CEQA Air Quality Guidelines also provide significance thresholds for emissions associated with proposed project operations. Operational emissions associated with the proposed project are estimated using the California Emissions Estimator Model (CalEEMod). Project-generated increases in emissions would be predominantly associated with motor vehicle use. The increase of traffic over existing conditions as a result of the project was obtained from the project's Transportation Impact Analysis prepared by Fehr and Peers (2019). The analysis also assumes that the existing Costco building would be reoccupied with a general commercial retail use consistent with the existing zoning. This impact analysis assumes full occupancy of the project site (Fehr and Peers, 2019). A brief explanation of this approach is presented below.

Each CEQA air quality impact was assessed based on comparison of pollutant emissions, concentrations, or quantifiable risk with the applicable threshold established by BAAQMD. To determine project impacts resulting from criteria pollutant emissions, the construction and operation emissions were quantified and compared with BAAQMD's established thresholds of significance. The size of the construction and operating area would be greater than the screening level sizes established by BAAQMD to evaluate criteria air pollutant impacts, so the project impacts were assessed through comparison against thresholds of significance for each criteria pollutant. As noted above, construction and operation emissions were quantified using CalEEMod Version 2016.3.2.

The mitigated output from CalEEMod show reductions from existing regulatory requirements and project design features that are termed "mitigation" within the model; however, those modeling components associated with locational measures and compliance with existing regulations are not considered mitigation under CEQA, but rather are treated as project design features. The project would incorporate design features and would obtain benefits from its location that would reduce project vehicle miles traveled compared to default values. The measures incorporated into the CalEEMod modeling and mitigation component include:

- **LUT-3 Increase Diversity of Land Uses**: The measure requires at least three different land uses within 0.25 mile. There are single-family residential, multi-family residential, retail, and office land uses within this distance from the project.
- **LUT-4 Improve Destination Accessibility**: The measure is based on distance to downtown or major job centers. The project is within three miles from an existing job center (CARB designated business district) in downtown Vallejo.
- **SDT-1 Improve Pedestrian Access**: This measure provides pedestrian access linking the project to other areas to encourage walking. The measure requires both on-site and off-site pedestrian

infrastructure. The proposed project incorporates sidewalks, paseos, and a trail designed to promote a pedestrian- and bicycle-friendly environment; to encourage alternative transportation between the commercial and residential project elements; and, improve access to the proposed open space.

- **LUT-5 Increase Transit Accessibility**: This measure requires the presence of a transit stop within walking distance of the project. CalEEMod calculates the reduction on the distance to the stop. MM TR-4 (refer to Chapter 4.15, Transportation) requires a new SolTrans bus stop with pull-out.

Additionally, the project would implement transportation mitigation measures that would construct pedestrian and bicycle infrastructure, improve bus service, and implement Transportation Demand Management (TDM) measures (refer to MM GHG-1 through GHG-12). The reductions attributable to these measures in CalEEMod are derived from methodologies compiled in the CAPCOA report Quantifying GHG Measures. Each measure was assessed to determine its consistency with CAPCOA criteria for the use of the measure.

Local CO concentrations were compared against BAAQMD's established screening criteria. According to BAAQMD CEQA Guidelines, if the preliminary screening procedure for a pollutant impact is followed and all screening criteria are met, the proposed project is assumed to result in a less-than-significant impact on air quality for the pollutant being screened. The screening criteria for local CO concentration are based on traffic volumes at nearby intersections, which were quantified as part of the traffic analysis conducted for the proposed project.

To evaluate potential odor impacts, a qualitative evaluation was conducted taking into account the nature of the project construction and operation. Typically, odor impact evaluations are more applicable to land uses with associated manufacturing, refining, painting/coating, food processing, or waste treatment activities, which, due to the nature of the operations, are large point-sources of odor emissions. There are no large odor point sources associated with the proposed project, so odor complaints by nearby receptors are unlikely. It is evident through qualitative analysis that during construction and operation, substantial numbers of people would not be adversely impacted by objectionable odors and thus odor impacts associated with this project would be less than significant. However, a qualitative discussion assessing potential odor impacts is included in the impacts discussion.

4.2.4 PROJECT IMPACTS AND MITIGATION

IMPACT AQ-1	***WOULD THE PROJECT, CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF THE APPLICABLE AIR QUALITY PLAN?*** ***(SIGNIFICANT AND UNAVOIDABLE IMPACT)***

The project site is an approximately 51.3-acre undeveloped, vacant site. The General Plan designation on the western portion of the site is Retail/Entertainment and the eastern portion of the site is designated Mix of Housing Types. According to the City's Zoning Map, the site is zoned Pedestrian Shopping and

Service District. The site is not designated as a housing opportunity site in the City of Vallejo's General Plan Housing Element. While the project is considered consistent with the existing General Plan and zoning designations, it does propose a zoning map amendment consistent with the adopted General Plan.

A project would be consistent with the 2017 Clean Air Plan if the project would not exceed the growth assumptions in the plan. The primary method of determining consistency with the 2017 Clean Air Plan growth assumptions is consistency with the General Plan land use designations and zoning designations for the site. If the General Plan growth forecast was adopted prior to the adoption of the 2017 Clean Air Plan, then it can be assumed that the 2017 Clean Air Plan incorporates the growth forecast from the General Plan. However, the City's General Plan was adopted in August 2017, after the 2017 Clean Air Plan was adopted by BAAQMD on April 19, 2017[3]. As such, the following analysis evaluates the project's consistency with the Clean Air Plan.

The project is conforming with City regulations (i.e., consistent with the current land use designations for the project site). It should be noted that the Clean Air Plan does not make a specific assumption for development on the site, but bases assumptions on growth in population, travel, and business, based on socioeconomic forecasts. As noted in Section 4.12 (Population and Housing), the project would not exceed the growth assumptions in the General Plan and project-related population growth would be well within the range of population growth forecasted by ABAG. The proposed project would generate new employment opportunities and would be consistent with the City's jobs and housing goals. Therefore, the growth assumptions in the Clean Air Plan would not be exceeded.

Additionally, projects are considered consistent with the 2017 Clean Air Plan if they incorporate all applicable and feasible control measures from the 2017 Clean Air Plan and would not disrupt or hinder implementation of any 2017 Clean Air Plan control measures. The project is consistent with the 2017 Clean Air Plan policies that are applicable to the project site. As discussed in *Table 4.2-6: Project Consistency with Applicable Clean Air Plan Control Measures*, the project would comply with city, state, and regional requirements, and to the extent applicable to the project and not otherwise required as a mitigation measure, will be imposed as a project condition of approval.

Table 4.2-6: Project Consistency with Applicable Clean Air Plan Control Measures

Control Measure	Project Consistency
Stationary Source Control Measures	
SS21: New Source Review of Toxic Air Contaminants	Consistent. This EIR has included a construction health risk assessment (HRA) (see Impact discussion AQ-3), which found the project's toxic air contaminant emissions would result in less than significant cancer and non- cancer (acute and chronic) impacts to the nearby sensitive receptors.
SS25: Coatings, Solvents, Lubricants, Sealants and Adhesives	Consistent. The project would comply with Regulation 8, Rule 3: Architectural Coatings, which would dictate the ROG content of paint available for use during construction (also required per MM AQ-1).
SS26: Surface Prep and Cleaning Solvent	

[3] It should be noted that the General Plan Designation for the project site under the City's previously adopted General Plan had a more intense land use designation of *Employment* on the eastern portion of the property compared to the current designation of *Mix of Housing Types*. The project is consistent with the current General Plan.

Table 4.2-6: Project Consistency with Applicable Clean Air Plan Control Measures

Control Measure	Project Consistency
SS29: Asphaltic Concrete	Consistent. Paving activities associated with the project would be required to utilize asphalt that does not exceed BAAQMD emission standards in Regulation 8, Rule 15.
SS30: Residential Fan Type Furnaces	Consistent. BAAQMD is the responsible party for implementation of this regulation and that the project would use the latest central furnaces that comply with the applicable regulations. The project would not conflict with BAAQMD's implementation of that measure.
SS31: General Particulate Matter Emissions Limitation	Consistent. Proposed restaurants would be required to utilize particulate emissions reduction equipment associated with their commercial cooking equipment.
SS32: Emergency Back-up Generators	Consistent. Use of back-up generators by the project is currently not anticipated. However, if emergency generators were to be installed they would be required to meet BAAQMD's emissions standards for back-up generators.
SS33: Commercial Cooking Equipment	Consistent. If any of the proposed retail uses include restaurants that would install a charbroiler, a catalytic oxidizer system must also be installed pursuant to BAAQMD Rule 6-2.
SS34: Wood Smoke	Consistent. The project would comply with BAAQMD Regulation 6, Rule 3 and General Plan Policy COS 8-4 to minimize emissions for wood-burning appliances/ fireplaces.
SS36: Particulate Matter from Trackout	Consistent. Mud and dirt that may be tracked out onto the nearby public roads during construction activities would be removed promptly by the contractor based on BAAQMD's requirements.
SS37: Particulate Matter from Asphalt Operations	Consistent. Paving and roofing activities associated with the project would be required to utilize best management practices to minimize the particulate matter created from the transport and application of road and roofing asphalt.
SS38: Fugitive Dust	Consistent. Material stockpiling and track out during grading activities as well as smoke and fumes from paving and roofing asphalt operations would be required to utilize best management practices to minimize the creation of fugitive dust.
SS40: Odors	Consistent. The project would comply with BAAQMD Regulation 7 to strengthen odor standards and enhance enforceability.
Transportation Control Measures	
TR2: Trip Reduction Programs	Consistent. The project is an infill development project that would include retail, residential, and open space areas near existing residential areas and retail services, thereby potentially reducing the need to travel long distances for some residents. MM GHG-3 (refer to Section 4.6, Greenhouse Gas) requires a residential and non-residential Transportation Demand Management (TDM) program to reduce vehicle miles traveled and mobile source emissions. The TDM program would include ridesharing and other trip reducing programs as well as bicycle and end-trip facilities. The proposed project incorporates sidewalks, paseos, and a trail designed to promote a pedestrian- and bicycle-friendly environment; to encourage alternative transportation between the commercial and residential project elements; and, improve access to the proposed open space. Additionally, MM TR-4 (refer to Section 4.14, Transportation) requires a new SolTrans bus stop with pull out.
TR8: Ridesharing and Last-Mile Connections	
TR9: Bicycle and Pedestrian Access Facilities	
TR10: Land Use Strategies	Consistent. This measure is a BAAQMD funding tool to maintain and disseminate information on current climate action plans and other local best practices and collaborate with regional partners to identify innovative funding mechanisms to help local governments address air quality and climate change in their general plans. As noted above, the project would include a mix of uses and amenities to

Table 4.2-6: Project Consistency with Applicable Clean Air Plan Control Measures

Control Measure	Project Consistency
	serve future residents and reduce the need to travel off-site. The project would not conflict with implementation of this measure.
TR13: Parking Policies	Consistent. The project would include the required amount of parking per the City of Vallejo Municipal Code. Parking areas would be located to provide efficient and convenient access to uses and to contribute to an overall efficient circulation pattern.
TR19: Medium and Heavy Duty Trucks	Not Applicable. Although the project does not involve warehousing or industrial uses that would generate substantial truck trips, the project would not conflict with the implementation of this measure.
TR22: Construction, Freight and Farming Equipment	Consistent. The project would comply through implementation of MM AQ-2, which requires all construction equipment greater than 50 horsepower to meet the Tier 4 emissions standards.
Energy and Climate Control Measures	
EN1: Decarbonize Electricity Generation	Consistent. The project would be constructed in accordance with the latest California Building Code and green building regulations/ CalGreen. The City of Vallejo has a California Breen Building Standards Checklist that the project would be required to comply with.
EN2: Decrease Electricity Demand	
Buildings Control Measures	
BL1: Green Buildings	Consistent. The project would be constructed in accordance with the latest California Building Code and green building regulations/CalGreen. The project would comply with the City of Vallejo's CalGreen Building Checklist.
L2: Decarbonize Buildings	
BL4: Urban Heat Island Mitigation	Consistent. The project would reduce urban heat island effects by providing green common spaces. A minimum of 5.7 acres of open space would be preserved. The proposed parking lots and other potential heat islands would incorporate trees, vegetation, and other landscape screening/shading devices.
Natural and Working Lands Control Measures	
NW2: Urban Tree Planting	Consistent. The project would implement a landscape plan that has been designed to meet the City's tree requirements in parking lots in order to reduce the urban heat island phenomenon that occurs in surface parking lots.
Waste Management Control Measures	
WA1: Landfills	Consistent. The waste service provider for the project would be required to meet the AB 341 and SB 939, 1374, and 1383 requirements that require waste service providers to divert and recycle waste.
WA3: Green Waste Diversion	
WA4: Recycling and Waste Reduction	
Water Control Measures	
WR2: Support Water Conservation	Consistent: The project would implement water conservation measures and low flow fixtures as required by Title 24 and CalGreen. The proposed project has been designed to be consistent with the State of California's Model Water Efficient Landscape Ordinance (MWELO), adopted January 1, 2010 and updated on July 15, 2015.

Source: BAAQMD, *Clean Air Plan*, 2017 and Kimley-Horn & Associates, 2019.

However, as described below in Impact AQ-2, operational air quality emissions generated by the proposed project would exceed BAAQMD's emissions thresholds for NO_X. These thresholds are established to identify projects that have the potential to generate a substantial amount of criteria air pollutants. Because the proposed project would exceed these thresholds, the proposed project would potentially conflict with BAAQMD's Clean Air Plan and impacts would be significant and unavoidable.

IMPACT AQ-2	***WOULD THE PROJECT RESULT IN A CUMULATIVELY CONSIDERABLE NET INCREASE OF ANY CRITERIA POLLUTANT FOR WHICH THE PROJECT REGION IS NON-ATTAINMENT UNDER AN APPLICABLE FEDERAL OR STATE AMBIENT AIR QUALITY STANDARD?*** ***(SIGNIFICANT AND UNAVOIDABLE IMPACT)***

CONSTRUCTION EMISSIONS

Short-term air quality impacts are predicted to occur during demolition, grading, and construction operations associated with implementation of the proposed project. Construction associated with the proposed project would generate criteria air pollutant emissions. Construction-generated emissions are relatively short term and of temporary duration, lasting only as long as construction activities occur, but are considered a significant air quality impact if the volume of pollutants generated exceeds BAAQMD's thresholds of significance. Temporary air emissions would result from particulate (fugitive dust) emissions from grading and building construction, and exhaust emissions from the construction equipment and the motor vehicles of the construction crew.

Construction results in the temporary generation of emissions resulting from demolition, site grading and excavation, road paving, motor vehicle exhaust associated with construction equipment and worker trips, and the movement of construction equipment, especially on unpaved surfaces. Emissions of airborne particulate matter are largely dependent on the amount of ground disturbance associated with site preparation activities as well as weather conditions and the appropriate application of water.

Emissions from the construction phase were estimated based on information from the project applicant for construction equipment requirements and schedule. It is assumed construction of the project would occur in Fall of 2020 and last approximately three years. Project construction would involve site preparation, mass grading of portions of the project site, excavation for utilities and foundation, utilities installation, paving, building construction (including lifting and placing HVAC units on the roof of the proposed Costco building via helicopter during no more than 2 days), and architectural coatings. CalEEMod was used to calculate expected pollutant emissions generated from the construction of the proposed project. *Table 4.2-7: Unmitigated and Mitigated Construction Emissions*, displays the maximum daily emissions in pounds per day that are expected to be generated from the construction of the proposed project in comparison to the daily thresholds established by BAAQMD.

Table 4.2-7: Unmitigated and Mitigated Construction Emissions

Emissions Source	Pollutant[1, 2]					
			Exhaust		Fugitive Dust	
	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
Unmitigated Annual Emissions (tons per year)						
2020 Construction	0.25	2.73	0.12	0.11	0.19	0.08
2021 Construction	0.33	2.87	0.14	0.13	0.13	0.04
2022 Construction	0.62	5.65	0.15	0.15	0.72	0.20
2023 Construction	3.92	4.31	0.13	0.12	0.66	0.18
Unmitigated Average Daily Emissions (pounds per day)[3]						
2020 Construction	5.55	61.44	2.75	2.53	4.35	1.80
2021 Construction	2.53	22.09	1.05	0.97	1.03	0.28
2022 Construction	4.79	43.49	1.19	1.12	5.51	1.50
2023 Construction	34.25	37.62	1.10	1.04	5.77	1.57
BAAQMD Significance Threshold (Average Daily Emissions in pounds per day)	54	54	82	54	N/A	N/A
Exceed BAAQMD Threshold?	**No**	**Yes**	**No**	**No**	**N/A**	**N/A**
Mitigated Annual Emissions (tons per year)[4]						
2020 Construction	0.06	0.42	0.02	0.02	0.19	0.08
2021 Construction	0.21	1.49	0.06	0.06	0.13	0.04
2022 Construction	0.48	3.97	0.06	0.06	0.72	0.20
2023 Construction	3.81	3.03	0.06	0.06	0.66	0.18
Mitigated Average Daily Emissions (pounds per day)[3, 4]						
2020 Construction	1.43	9.45	0.40	0.38	4.35	1.80
2021 Construction	1.64	11.45	0.50	0.47	1.03	0.28
2022 Construction	3.69	30.57	0.47	0.47	5.51	1.50
2023 Construction	33.31	26.48	0.51	0.51	5.77	1.57
BAAQMD Significance Threshold (Average Daily Emissions in pounds per day)	54	54	82	54	N/A	N/A
Exceed BAAQMD Threshold?	**No**	**No**	**No**	**No**	**N/A**	**N/A**

Notes:

1. Emissions were calculated using CalEEMod. Emissions include compliance with BAAQMD's Basic Construction Mitigation Measures Recommended for All Projects. These measures include the following: water exposed surfaces two times daily; cover haul trucks; clean track outs with wet powered vacuum street sweepers; limit speeds on unpaved roads to 15 miles per hour; complete paving as soon as possible after grading; limit idle times to 5 minutes; properly maintain mobile and other construction equipment; and post a publicly visible sign with contact information to register dust complaints and take corrective action within 48 hours. These emissions results represent the "mitigated" emissions shown in Appendix C, *Air Quality and GHG Data*.
2. Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, updated May 2017. Source: Refer to the CalEEMod outputs provided in Appendix C, *Air Quality and GHG Data*.

Table 4.2-7: Unmitigated and Mitigated Construction Emissions

Emissions Source	Pollutant[1, 2]					
			Exhaust		Fugitive Dust	
	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)

3. Average daily emissions were calculated using the following formula:
   Annual Emissions (tons per year) x 2,000 (the tons-to-pounds conversion factor)/number of working construction days (by year).
4. Includes implementation of MM AQ-2 requiring BAAQMD Additional Construction Mitigation Measures.

Fugitive Dust

Fugitive dust emissions are associated with land clearing, grading, ground excavation, cut-and-fill operations, demolition, truck travel on unpaved roadways, and lifting and placing HVAC units on the roof of the proposed Costco building via helicopter. Dust emissions also vary substantially from day to day, depending on the level of activity, the specific operations, and weather conditions. Fugitive dust emissions may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the project vicinity. Uncontrolled dust from construction can become a nuisance and potential health hazard to those living and working nearby. BAAQMD recommends the implementation of all Basic Construction Mitigation Measures, whether or not construction-related emissions exceed applicable significance thresholds. See MM AQ-1 below and the Summary section for discussion of impacts.

Construction Equipment and Worker Vehicle Exhaust

Exhaust emissions from construction activities include emissions associated with the transport of machinery and supplies to and from the project site, emissions produced on-site as the equipment is used, and emissions from trucks transporting materials and workers to and from the site. Emitted pollutants would include ROG, NO_X, PM_{10}, and $PM_{2.5}$. Exhaust emission factors for typical diesel-powered heavy equipment are based on the CalEEMod program defaults. Variables factored into estimating the total construction emissions include: level of activity, length of construction period, number of pieces/types of equipment in use, site characteristics, weather conditions, number of construction personnel, and the amount of materials to be transported onsite or offsite. As shown in Table 4.2-7, unmitigated construction equipment and worker vehicle exhaust emissions would not exceed BAAQMD thresholds for all criteria pollutants except for NO_x. However, implementation of MM AQ-2 requiring BAAQMD Additional Construction Mitigation Measures would reduce construction NO_x emissions below BAAQMD thresholds. BAAQMD also recommends the implementation of all Basic Construction Mitigation Measures, whether or not construction-related emissions exceed applicable significance thresholds. See MM AQ-1 and MM AQ-2 below and the Summary section for discussion of impacts.

ROG Emissions

In addition to gaseous and particulate emissions, the application of asphalt and surface coatings creates ROG emissions, which are O_3 precursors. In accordance with the methodology prescribed by BAAQMD, the ROG emissions associated with paving have been quantified with CalEEMod. In addition, based upon the size of the buildings, architectural coatings are also quantified in CalEEMod.

The highest concentration of ROG emissions would be generated during the application of architectural coatings beginning in 2023 and lasting approximately seven months. This phase includes the interior and exterior painting as well as striping of all paved parking areas and roadways. Paints would be required to comply with BAAQMD Regulation 8, Rule 3: Architectural Coating. Regulation 8, Rule 3 provides specifications on painting practices and regulates the ROG content of paint.

Naturally Occurring Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by State, Federal, and international agencies and was identified as a toxic air contaminant by the CARB in 1986. Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. According to the Department of Conservation Division of Mines and Geology, *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos* (August 2000), serpentinite and ultramafic rocks are not known to occur within the project area. As a result, no impacts associated with natural occurring asbestos would occur.

Summary

The proposed project would not cause exceedances for ROG, PM_{10} or $PM_{2.5}$ (see Table 4.2-7). Although BAAQMD does not have numerical thresholds for fugitive PM_{10} and $PM_{2.5}$ emissions, the proposed project would be required to comply with BAAQMD Basic Construction Measures (refer to MM AQ-1). In addition, NO_x emissions would be reduced below BAAQMD thresholds with implementation of BAAQMD Additional Construction Mitigation Measures outlined in MM AQ-2 (see Table 4.2-7). The project would also be subject to applicable BAAQMD Regulations, such as Regulation 8 Rule 3: Architectural Coatings and 15: Emulsified and Liquid Asphalts, and Regulation 9, Rule 8: Organic Compounds to further reduce specific construction-related emissions. The calculated emission results from CalEEMod demonstrate that the construction of this project would not exceed average daily thresholds created by BAAQMD with implementation of MM AQ-1 and MM AQ-2.

In order to protect public health from criteria pollutant emissions, BAAQMD has set its CEQA significance threshold based on the trigger levels for the federal New Source Review (NSR) Program and BAAQMD's Regulation 2, Rule 2 for new or modified sources. The NSR Program[4] was created by the FCAA to ensure that stationary sources of air pollution are constructed or modified in a manner that is consistent with attainment of health-based federal ambient air quality standards. The federal ambient air quality standards establish the levels of air quality necessary, with an adequate margin of safety, to protect the public health. As shown in Table 4.2-7, construction emissions would not exceed BAAQMD thresholds with implementation of MM AQ-1 and MM AQ-2, and therefore would not violate any air quality standards or contribute substantially to an existing or projected air quality violation and no criteria pollutant health impacts would occur. Therefore, sensitive receptors would not be exposed to criteria pollutant levels in excess of the health-based ambient air quality standards. Project construction impacts would be less than significant.

Operational Emissions

Operational emissions for residential and commercial developments are typically generated from mobile sources (burning of fossil fuels in cars); energy sources (cooling, heating, and cooking); and area sources (landscape equipment and household products). *Table 4.2-8: Unmitigated and Mitigated Project Operational Emissions*, identifies the operational emissions for the proposed project.

Table 4.2-8: Unmitigated and Mitigated Project Operational Emissions

Emission Source	Reactive Organic Gases (ROG)	Exhaust			Fugitive	
		Nitrogen Oxides (NO_X)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
Unmitigated Annual Emissions (maximum tons per year)						
Area Source Emissions	2.41	0.03	0.01	0.01	0.00	0.00
Energy Emissions	0.03	0.27	0.02	0.02	0.00	0.00
Mobile Emissions[1]	2.54	13.04	0.07	0.07	7.20	1.93
Off-road	0.11	1.05	0.06	0.06	0.00	0.00
Total Project Unmitigated Emissions	5.09	14.39	0.17	0.16	7.20	1.93
Unmitigated Average Daily Emissions (pounds)						
Area Source Emissions	13.23	0.18	0.05	0.05	0.00	0.00
Energy Emissions	0.17	1.45	0.12	0.12	0.00	0.00
Mobile Emissions[1]	13.90	71.44	0.38	0.38	39.45	10.58
Off-road	0.62	5.76	0.36	0.33	0.00	0.00
Total Project Unmitigated Emissions	27.91	78.83	0.90	0.88	39.45	10.58
Mitigated Annual Emissions (maximum tons per year)						
Area Source Emissions	2.39	0.01	0.01	0.01	0.00	0.00
Energy Emissions	0.03	0.27	0.02	0.02	0.00	0.00

[4] Code of Federal Regulation (CFR) [i.e., PSD (40 CFR 52.21, 40 CFR 51.166, 40 CFR 51.165 (b)), Non-attainment NSR (40 CFR 52.24, 40 CFR 51.165, 40 CFR part 51, Appendix S)

Table 4.2-8: Unmitigated and Mitigated Project Operational Emissions

Emission Source	Reactive Organic Gases (ROG)	Exhaust			Fugitive	
		Nitrogen Oxides (NO_X)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
Mobile Emissions[1]	2.07	10.22	0.03	0.03	2.71	0.73
Off-road	0.11	1.05	0.06	0.06	0.00	0.00
Total Project Mitigated Emissions[2]	4.61	11.55	0.12	0.12	2.71	0.73
BAAQMD Threshold[4]	*10*	*10*	*15*	*10*	*N/A*	*N/A*
Is Threshold Exceeded?	**No**	**Yes**	**No**	**No**	**N/A**	**N/A**
Mitigated Average Daily Emissions (pounds)						
Area Source Emissions	13.11	0.07	0.03	0.03	0.00	0.00
Energy Emissions	0.17	1.45	0.12	0.12	0.00	0.00
Mobile Emissions[1]	11.35	56.02	0.16	0.16	14.85	4.00
Off-road	0.62	5.76	0.36	0.33	0.00	0.00
Total Project Mitigated Emissions[2]	25.24	63.30	0.67	0.64	14.85	4.00
BAAQMD Threshold[4]	*54*	*54*	*82*	*54*	*N/A*	*N/A*
Is Threshold Exceeded?	**No**	**Yes**	**No**	**No**	**N/A**	**N/A**

Notes:

1. Proposed project mobile emissions are based on the net total project trip generation of 11,060 daily vehicle trips on weekdays, 11,539 daily vehicle trips on Saturdays, and 10,875 daily vehicle trips on Sundays per the project Traffic Impact Analysis.
2. Project Design Features were incorporated into the CalEEMod mitigation module. These design features include increased diversity of land uses, improve destination accessibility due to proximity to downtown Vallejo, increase transit accessibility, improve pedestrian network and provide traffic calming measures. MM TR-4 (refer to Chapter 4.15, Transportation) requires a new SolTrans bus pull-out. MM GHG-1 through GHG-12 are also included.
3. Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, 2017. Source: Refer to the CalEEMod outputs provided in Appendix C, *Air Quality and GHG Data*.

Mobile Source Emissions

Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, ROG, NO_X, PM_{10}, and $PM_{2.5}$ are all pollutants of regional concern (NO_X and ROG react with sunlight to form O_3 [photochemical smog], and wind currents readily transport PM_{10} and $PM_{2.5}$). However, CO tends to be a localized pollutant, dispersing rapidly at the source.

Project-generated vehicle emissions have been estimated using CalEEMod. Trip generation rates associated with the project were based on the project Transportation Impact Analysis (TIA). Based on the TIA, the proposed project would result in an average of approximately 18,560 daily vehicle trips on weekdays, 21,254 daily vehicle trips on Saturdays, and 17,469 daily vehicle trips on Sundays. As described in the TIA, the existing Costco currently generates 12,860 daily vehicle trips and would be replaced by a retail use that would generate approximately 5,360 daily vehicle trips, for a net reduction of 7,500 daily vehicle trips (i.e., total net trip generation would be 11,060 daily vehicles on weekdays, 11,539 daily vehicles on Saturdays, and 10,875 daily vehicles on Sundays). Table 4.2-8 shows the net unmitigated

project emissions generated by vehicle traffic associated with the proposed project would exceed established BAAQMD regional thresholds for NO_X emissions. Following compliance with the Commute Trip Reduction (CTR)/Transportation Demand Management (TDM) plan required per MM GHG-3, additional trip-reduction measures outlined in MM GHG-4 through MM GHG-6 and MM GHG-8, and construction of a new SolTrans bus pull-out as part of MM TR-4, the project's mobile NO_X emissions would be reduced, but still exceed BAAQMD thresholds (see Table 4.2-8).

Energy Source Emissions

Energy source emissions would be generated as a result of electricity and natural gas (non-hearth) usage associated with the proposed project. The primary use of electricity and natural gas by the proposed project would be for space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. As shown in Table 4.2-8, energy source emissions from the proposed project would not exceed BAAQMD thresholds for ROG, NO_X, PM_{10}, or $PM_{2.5}$.

Area Source Emissions

Area source emissions would be generated due to an increased demand for consumer products, architectural coating, and landscaping. The proposed project would also include off-road emissions associated with onsite equipment (e.g., forklifts) used at the Costco location. Area source emissions from the proposed project would not exceed BAAQMD thresholds (see Table 4.2-8).

Off-Road Emissions

Off-road area emissions would be generated from off-road equipment used in the proposed retail buildings (e.g., forklifts). The off-road equipment would be required to be alternatively fueled (e.g., forklifts would be electric or natural gas-powered) as required by MM GHG-7 in Chapter 4.6, Greenhouse Gas Emissions.

Total Operational Emissions

As shown in Table 4.2-8, total project operations would not cause exceedances of 54 pounds per day for ROG and $PM_{2.5}$, or 82 pounds per day for PM_{10} due to project design features and the implementation of MM TR-4 and MM GHG-7. However, mobile NO_x emissions would exceed BAAQMD thresholds despite implementation of MM GHG-3 through MM GHG-6, MM GHG-8, and MM TR-4 (see Table 4.2-8). As such, there are no other feasible mitigation measures to reduce mobile NO_x emissions below BAAQMD thresholds and impacts would be significant.

Criteria Pollutant Health Impacts

On December 24, 2018, the California Supreme Court issued an opinion identifying the need to provide sufficient information connecting a project's air emissions to health impacts or explain why such information could not be ascertained (Sierra Club v. County of Fresno [Friant Ranch, L.P.] [2018] 6 Cal.5th502, Case No. S219783). In light of this decision, the following section is intended to discuss its applicability to the proposed project.

The Friant Ranch project was a 942-acre Specific Plan that involved a large, regionally significant commercial master-planned community of approximately 2,500 dwelling units and extensive commercial supporting development. The anticipated air quality impacts resulting from the Friant Ranch development included significant and unavoidable emissions of multiple criteria pollutants (including significant emissions of both primary O_3 precursors [NO_X and ROGs]) at levels that well exceeded the daily thresholds of significance. As noted above and shown in Table 4.2-8, the proposed project's operational emissions would slightly exceed BAAQMD's NO_X significance threshold despite the implementation of mitigation measures, resulting in a significant and unavoidable impact. Further, the proposed project is not regionally significant because it includes less than 500 dwelling units and a commercial area that is well under 500,000 square feet of floor space.

BAAQMD has set its CEQA significance threshold based on the trigger levels for the federal NSR Program and BAAQMD's Regulation 2, Rule 2 for new or modified sources. The NSR Program[5] was created to ensure projects are consistent with attainment of health-based federal ambient air quality standards. The federal ambient air quality standards establish the levels of air quality necessary, with an adequate margin of safety, to protect the public health. Therefore, projects that do not exceed BAAQMD's thresholds would not violate any air quality standards or contribute substantially to an existing or projected air quality violation and no cumulative criteria pollutant health impacts.

NO_X and ROG are precursor emissions that form ozone in the atmosphere in the presence of sunlight where the pollutants undergo complex chemical reactions. It takes time and the influence of meteorological conditions for these reactions to occur, so ozone may be formed at a distance downwind from the sources. Breathing ground-level ozone can result health effects that include: reduced lung function, inflammation of airways, throat irritation, pain, burning, or discomfort in the chest when taking a deep breath, chest tightness, wheezing, or shortness of breath. In addition to these effects, evidence from observational studies strongly indicates that higher daily ozone concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that ozone can make asthma symptoms worse and can increase sensitivity to asthma triggers.

Table 4.2-8 shows that a large proportion of the project's NO_X and ROG emissions are from mobile sources. The ROG emissions are below BAAQMD thresholds, and the mitigated NOx emissions only slightly exceed BAAQMD thresholds. Under California law, the local and regional districts are primarily responsible for controlling air pollution from all sources except motor vehicles. CARB (a branch of the California EPA) is primarily responsible for controlling pollution from motor vehicles. The air districts must adopt rules to achieve and maintain the State and Federal AAQS within their jurisdictions. Mobile emissions from vehicles will continue to decrease over time given evolving clean air technology requirements and the increase in use of electric vehicles.

Ozone Trends. According to BAAQMD's 2017 Clean Air Plan, the major air quality improvements achieved over the past several decades have greatly benefited public health in the Bay Area, even as the region's

[5] Code of Federal Regulation (CFR) [i.e., PSD (40 CFR 52.21, 40 CFR 51.166, 40 CFR 51.165 (b)), Non-attainment NSR (40 CFR 52.24, 40 CFR 51.165, 40 CFR part 51, Appendix S)

population, the amount of motor vehicle travel, and economic output have all grown substantially. Population exposure to unhealthy ozone levels declined dramatically. In 1986–1988, the average Bay Area resident was exposed to unhealthy ozone concentrations 213 hours per year. Exposure to unhealthy ozone levels (ozone exceeding the state one-hour standard of 95 parts per billion) has been reduced to less than one hour per year during the 2012–2014 period, an overall reduction of 99.8 percent.[6] Ozone levels are decreasing because of the mandated controls on motor vehicles and the replacement of older polluting vehicles with lower-emitting vehicles. NO_X emissions (an ozone precursor) from electric utilities have also decreased due to the use of cleaner fuels and renewable energy. The 2017 Clean Air Plan control strategy includes 85 control measures to reduce multiple pollutants and serve both to protect public health and the climate. With continued implementation of the control measures, the 2017 Clean Air Plan projects continued reductions in emissions and ambient concentrations of ozone and PM and decreases in population exposure to the most harmful air pollutants, such as fine PM and TACs, in impacted communities.

Part of the control process of BAAQMD's duty to greatly improve the air quality in the Basin is the uniform CEQA review procedures required by BAAQMD's CEQA Air Quality Guidelines. The single threshold of significance used to assess direct project and cumulative impacts has improved air quality as evidenced by the track record of the air quality in the Basin dramatically improving over the course of the past decades. As stated by BAAQMD, the thresholds of significance are based on factual and scientific data and are therefore appropriate thresholds of significance to use for the project.

Toxic Air Contaminants (TAC) Trends. In 1984, as a result of public concern for exposure to airborne carcinogens, CARB adopted regulations to reduce the amount of air toxic contaminant emissions resulting from mobile and area sources, such as cars, trucks, stationary products, and consumer products. According to the Ambient and Emission Trends of Toxic Air Contaminants in California journal article[7] which was prepared for CARB, results show that between 1990-2012, ambient concentration and emission trends for the seven TACs responsible for most of the known cancer risk associated with airborne exposure in California have declined significantly (between 1990 and 2012). The seven TACs studied include those that are derived from mobile sources: diesel particulate matter (DPM), benzene, and 1,3-butadiene; those that are derived from stationary sources: perchloroethylene and hexavalent chromium; and those derived from photochemical reactions of emitted VOCs: formaldehyde and acetaldehyde. TACs data was gathered at monitoring sites from both the Bay Area and South Coast Air Basins. The decline in ambient concentration and emission trends of these TACs are a result of various regulations CARB has implemented to address cancer risk.

Mobile Source TACs. CARB introduced two programs that aimed at reducing mobile emissions for light and medium-duty vehicles through vehicle emissions controls and cleaner fuel. In California, light-duty vehicles sold after 1996 are equipped with California's second-generation On-Board Diagnostic system. The On-Board Diagnostic II system monitors virtually every component that can affect the emission performance of the vehicle to ensure that the vehicle remains as clean as possible over its entire life and

[6] Bay Area Air Quality Management District, *Clean Air Plan 2017*, page 2/24, 2017.

[7] Ralph Propper, Patrick Wong, Son Bui, Jeff Austin, William Vance, Alvaro Alvarado, Bart Croes, and Dongmin Luo, *Ambient and Emission Trends of Toxic Air Contaminants in California. American Chemical Society: Environmental Science & Technology.* 2015.

assists repair technicians in diagnosing and fixing problems with the computerized engine controls. If a problem is detected, the On-Board Diagnostic II system illuminates a warning lamp on the vehicle instrument panel to alert the driver. This warning lamp typically contains the phrase Check Engine or Service Engine Soon which will preclude a vehicle from passing a smog check required as part of the annual vehicle registration process until the problem is addressed. The system will also store important information about the detected malfunction so that a repair technician can accurately find and fix the problem. CARB has recently developed similar On-Board Diagnostic requirements for heavy-duty vehicles over 14,000 pounds. CARB's phase II Reformulated Gasoline regulation, adopted in 1996, also led to a reduction of mobile source emissions. Through such regulations, benzene levels declined 88 percent from 1990-2012. 1,3-Butadiene concentrations also declined 85 percent from 1990-2012 as a result of the use of reformulated gasoline and motor vehicle regulations[8].

In 2000, CARB's Diesel Risk Reduction Plan recommended the replacement and retrofit of diesel-fueled engines and the use of ultra-low-sulfur (<15 ppm) diesel fuel. As a result of these measures, DPM concentrations have declined 68 percent since 2000, even though the state's population increased 31 percent and the amount of diesel vehicles miles traveled increased 81 percent. With the implementation of these diesel-related control regulations, CARB expects a DPM decline of 71 percent for 2000-2020.

Cancer Risk Trends. Based on information available from CARB, overall cancer risk throughout the Basin has had a declining trend since 1990. In 1998, following an exhaustive 10-year scientific assessment process, CARB identified particulate matter from diesel-fueled engines as a toxic air contaminant.

Criteria Pollutant Health Risk. As noted in the Brief of Amicus Curiae by the South Coast Air Quality Management District (SCAQMD) in the Friant Ranch case (April 6, 2015) (Brief), the SCAQMD has among the most sophisticated air quality modeling and health impact evaluation capability of any of the air districts in the State, and thus it is uniquely situated to express an opinion on how lead agencies should correlate air quality impacts with specific health outcomes. The Brief discusses that it may be infeasible to quantify health risks caused by individual projects, due to various factors. It is necessary to have data regarding the sources and types of air toxic contaminants, location of emission points, velocity of emissions, the meteorology and topography of the area, and the location of receptors (worker and residence). The Brief also cites the author of the CARB methodology, which reported that a $PM_{2.5}$ methodology is not suited for small projects and may yield unreliable results. Similarly, SCAQMD staff does not currently know of a way to accurately quantify O_3-related health impacts caused by NO_X or ROG (VOC) emissions from relatively small projects, due to photochemistry and regional model limitations. The Brief concludes, with respect to the Friant Ranch EIR, that although it may have been technically possible to plug the data into a methodology, the results would not have been reliable or meaningful. In comparison, the proposed project is not regionally significant and would be considered a relatively small project.

[8] Ibid.

The Brief makes it clear that SCAQMD does not believe that there must be a quantification of a project's health risks in all CEQA documents prepared for individual projects. Any attempt to quantify the proposed project's health risks would be considered unreliable and misleading.

Although it may be misleading and unreliable to attempt to specifically and numerically quantify the project's health risks, this analysis provides extensive information concerning the project's potential health risks. While the project is expected to exceed BAAQMD's numeric regional mass daily thresholds for operational NO_X, simply exceeding these thresholds does not in itself constitute a significant health impact to the population adjacent to the project and within the Basin. The reason for this is that the mass daily thresholds are in pounds per day (or tons per year) emitted into the air whereas health effects are determined based on the concentration of emissions in the air at a particular receptor (e.g., parts per million by volume of air, or micrograms per cubic meter of air). State and federal AAQS were developed to protect the most susceptible population groups from adverse health effects and were established in terms of parts per million or micrograms per cubic meter for the applicable emissions.

Furthermore, air quality trends for both emissions of NO_X, VOCs, and O_3 (which is a byproduct of NO_X and VOCs) have been trending downward within the air basin even as development has increased over the last several years. Therefore, although the project would slightly exceed BAAQMD's numeric thresholds for emissions of NO_X, this does not in itself constitute a basin-wide increase in health effects related to these pollutants.

As noted in the Brief, it would be extremely difficult, if not impossible to quantify health impacts of criteria pollutants for various reasons, including modeling limitations, as well as where in the atmosphere air pollutants interact and form for a development as small as the proposed project. Furthermore, as noted in the Brief of Amicus Curiae by the San Joaquin Valley Air Pollution Control District (April 13, 2015), San Joaquin Valley Air Pollution Control District has acknowledged that currently available modeling tools are not equipped to provide a meaningful analysis of the correlation between an individual development project's air emissions and specific human health impacts. The San Joaquin Valley Air Pollution Control District notes, "…the Air District is simply not equipped to analyze and to what extent the criteria pollutant emissions of an individual CEQA project directly impact human health in a particular area…even for projects with relatively high levels of emissions of criteria pollutant precursor emissions."

Information on health impacts related to exposure to O_3 and particulate matter emissions published by the U.S. EPA and CARB have been summarized above and discussed in the Regulatory Framework section. Health studies are used by these agencies to set the Federal and State AAQS. None of the health-related information can be directly correlated to the pounds/day or tons/year of emissions estimated from a single project.

Ozone is not formed at the location of emission and the quantity of precursor emissions is not proportional to local ozone concentrations. The emission of NO_X and ROG do not directly cause health effects; it is the resulting concentration of criteria pollutants, which is influenced by sunlight, chemical

reactions, and transport (i.e., regional impacts), that are not feasible to model at the project level.[9] In addition, current BAAQMD and CARB regulations will reduce the emissions below what is shown in Table 4.2-8. Given the relatively small size of the proposed project, the health impacts associated with the proposed project's NOx emissions, which are only slightly above BAAQMD operational thresholds, would be minuscule.

As discussed above, neither BAAQMD nor any other air district currently have methodologies or thresholds that would provide Lead Agencies and CEQA practitioners with a consistent, reliable, and meaningful analysis to correlate specific health impacts that may result from this small proposed project's mass emissions. Information on health impacts related to exposure to ozone and particulate matter emissions published by the U.S. EPA and CARB have been summarized above and discussed in the Regulatory Framework section. For this reason, the discussion above explains in detail why a numerical analysis would not be reliable or meaningful and why health-based impacts are anticipated to be less than significant.

Cumulative Construction Emissions

The Basin is designated nonattainment for O_3, PM_{10}, and $PM_{2.5}$ for State standards and nonattainment for O_3 and $PM_{2.5}$ for federal standards. As discussed above, the project's construction-related emissions by themselves would not have the potential to exceed BAAQMD significance thresholds for criteria pollutants with the implementation of MM AQ-2, which would require off-road equipment to meet Tier 4 emissions standards and other BAAQMD Additional Construction Mitigation Measures.

Since these thresholds indicate whether an individual project's emissions have the potential to affect cumulative regional air quality, it can be expected that the project-related construction emissions would not be cumulatively considerable. BAAQMD recommends Basic Construction Mitigation Measures for all projects whether or not construction-related emissions exceed the thresholds of significance. Compliance with BAAQMD construction-related mitigation requirements are considered to reduce cumulative impacts at a Basin-wide level. As a result, construction emissions associated with the proposed project would not result in a cumulatively considerable contribution to significant cumulative air quality impacts.

Cumulative Operational Emissions

BAAQMD has not established separate significance thresholds for cumulative operational emissions. The nature of air emissions is largely a cumulative impact. As a result, no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. BAAQMD developed the operational thresholds of significance based on the level above which a project's individual emissions

[9] As noted in the San Joaquin Valley Air Pollution Control District (SJVAPCD) Amicus Curiae Brief for *Sierra Club v. County of Fresno, t*he computer models used to simulate and predict and attainment date for ozone or particulate matter NAAQS are based on regional inputs, such as regional inventories of precursor pollutants (NO_X, SO_X, and VOCs) and atmospheric chemistry and meteorology. The models simulate future ozone or PM levels based on predicted changes in precursor emissions region wide. The goal of these modeling exercises is not to determine whether the emissions generated by a particular factory or development project will affect the NAAQS attainment date. Rather, the air district modeling and planning strategy is regional in nature and based on the extent to which all of emission-generating sources (current and future) must be controlled in order to reach attainment.

would result in a cumulatively considerable contribution to the Basin's existing air quality conditions. Therefore, a project that exceeds BAAQMD operational thresholds would also be a cumulatively considerable contribution to a significant cumulative impact.

As shown in Table 4.2-8, the proposed project's operational emissions would exceed BAAQMD thresholds for NO_x despite the implementation of project design features and all feasible mitigation measures described above that would minimize operational emissions. As a result, operational emissions associated with the proposed project would result in a cumulatively considerable contribution to significant cumulative air quality impacts.

Mitigation Measures:

Refer to MM TR-4 (Chapter 4.15) and MM GHG-1 through GHG-12 (Chapter 4.6). The following additional mitigation measures are also required.

MM AQ-1: **BAAQMD Basic Construction Measures.** Prior to any grading activities, the applicant shall prepare and implement a Construction Management Plan that includes BAAQMD Basic Construction Mitigation Measures to minimize construction-related emissions. This shall plan shall first be reviewed and approved by the Director of Public Works/City Engineer. BAAQMD Basic Construction Mitigation Measures are:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

MM AQ-2: **BAAQMD Additional Construction Mitigation Measures.** Prior to the issuance of any grading permits, the applicant shall prepare and implement a Construction Management Plan that includes BAAQMD Additional Construction Mitigation Measures to minimize construction-related emissions. This shall plan shall first be reviewed and approved by the Planning & Development Services Director. The applicable BAAQMD Additional Construction Mitigation Measures are:

- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- Idling time of diesel-powered construction equipment shall be limited to two minutes.
- The project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction (i.e., owned, leased, and subcontractor vehicles) will meet United States Environmental Protection Agency Tier 4 final off-road emissions standards or would achieve a project-wide fleet-average 20 percent NO_X reduction and 45 percent PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.
- Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., BAAQMD Regulation 8, Rule 3: Architectural Coatings).
- Requiring that all construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NO_X and PM.
- Require the lifting and placing of HVAC units on the roof of the proposed Costco building via helicopter to only occur when no other excavation, grading, and ground-disturbing construction activities are being conducted on the project site and only once the commercial component of the project has been fully paved.

IMPACT AQ-3	***WOULD THE PROJECT EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTANT CONCENTRATIONS?*** ***(LESS THAN SIGNIFICANT IMPACT)***

Sensitive land uses are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses.

Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. Sensitive receptors in the area include single-family residences approximately 96 feet to the east and multi-family residences approximately 150 feet south of the project site.

TOXIC AIR CONTAMINANTS

Construction equipment and associated heavy-duty truck traffic generate diesel exhaust, which is a known toxic air contaminants (TACs). Diesel exhaust from construction equipment operating at the site poses a health risk to nearby sensitive receptors. The closest sensitive receptor to the project site is the residences to the east and south of the project site. BAAQMD provides guidance for evaluating impacts from TACs in its CEQA Air Quality Guidelines document. As noted therein, an incremental cancer risk of greater than 10 cases per million at the Maximally Exposed Individual (MEI) will result in a significant impact. BAAQMD considers exposure to annual $PM_{2.5}$ concentrations that exceed 0.3 $\mu g/m^3$ from a single source to be significant. BAAQMD significance threshold for non-cancer hazards is 1.0.

BAAQMD CARE program focuses on TACs. The project does not contribute to a significant amount of TACs including diesel particulates or particulate matter. The project design locates the residential area away from the I-80 freeway. The residential area is located approximately 1,000 feet away from the freeway and is separated by the proposed commercial and open space areas. The proposed project does not conflict with any of the CARE program goals of evaluating health risk assessments and minimizing impacts on low-income communities. As discussed in the analysis below, a Health Risk Assessment was prepared for the project site and determined that exposure to TAC would be well below the threshold concentrations and that the project would not result in adverse impacts to sensitive receptors as a result of the proposed project. The proposed project is not located in an area that is designated as a low-income community. The project would keep commercial vehicles on main thoroughfares and would not require diesel trucks, including fuel trucks, to travel through residential areas to access the site. As such, the proposed project does not conflict with the goals and policies of BAAQMD CARE program.

CONSTRUCTION TACS

Construction would result in the generation of diesel particulate matter (DPM) emissions from the use of off-road diesel equipment required for grading and excavation, paving, and other construction activities. For construction activity, DPM is the primary toxic air contaminant of concern. On-road diesel-powered haul trucks traveling to and from the construction area to deliver materials and equipment are less of a concern because they would not stay on the site for long durations. Diesel exhaust from construction equipment operating at the site poses a health risk to nearby sensitive receptors. The closest sensitive receptor to the project site are residences approximately 96 feet and 150 feet to the east and south, respectively.

Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer. The use of diesel-powered construction equipment would be episodic and would occur throughout the 51-acre site. Additionally, construction activities would be subject to and would comply with California regulations limiting idling to no more than 5 minutes, which

would further reduce nearby sensitive receptors' exposure to temporary and variable DPM emissions. Furthermore, even during the most intense year of construction, emissions of DPM would be generated from different locations on the project site rather than in a single location because different types of construction activities (e.g., site preparation and building construction) would not occur at the same place at the same time.

The U.S. EPA recommended screening model AERSCREEN has been used to evaluate potential health effects to sensitive receptors from construction DPM emissions. AERSCREEN is the recommended screening model based on the AERMOD dispersion model. The model produces estimates of worst-case concentrations without the need for hourly meteorological data. According to the U.S. EPA Support Center for Regulatory Atmospheric Modeling (SCRAM) website, AERSCREEN is intended to produce concentration estimates that are equal to or greater than the estimates produced by AERMOD with a fully developed set of meteorological and terrain data. Maximum (worst case) $PM_{2.5}$ exhaust construction emissions over the entire construction period were used in AERSCREEN to approximate construction DPM emissions. Risk levels were calculated according to the California Office of Environmental Health Hazard Assessment (OEHHA) guidance document, Air Toxics Hot Spots Program Risk Assessment Guidelines (February 2015).

Results of this assessment indicate that the maximum concentration of $PM_{2.5}$ during construction would be 0.002 µg/m^3, which is below BAAQMD threshold of 0.3 µg/m^3. The highest calculated carcinogenic risk from project construction is 1.77 per million based on a PM_{10} annual average concentration of 0.00263 µg/m^3, which is below BAAQMD threshold of 10 in one million. Non-cancer hazards for DPM would be below BAAQMD threshold of 1.0, with a chronic hazard index computed at 0.0004 and an acute hazard index of 0.0008. As described above, worst-case construction risk levels based on screening-level modeling (AERSCREEN) and conservative assumptions would be below BAAQMD's thresholds. Therefore, construction risk levels would be less than significant.

Another potential source of TACs associated with construction-related activities is the airborne entrainment of asbestos due to the disturbance of naturally-occurring asbestos-containing soils. As noted in Impact Statement AQ-2, the proposed project is not located in an area designated by the State of California as likely to contain naturally-occurring asbestos[10]. As a result, construction-related activities would not be anticipated to result in increased exposure of sensitive land uses to asbestos.

Impacts associated with construction activities would be less than significant.

ON-SITE IMPACTS

Mobile Sources

Pursuant to *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369, Case No. S213478, agencies are not required to analyze the CEQA impact of existing environmental conditions on a project's future users or residents, unless the proposed project risks

[10] California Department of Conservation Division of Mines and Geology, *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos,* August 2000.

exacerbating those environmental hazards or conditions that already exist. Therefore, the following mobile source health risk analysis has been prepared as an information item for land use decision making but is not a CEQA required analysis.

The project would place sensitive receptors within 1,000 feet of I-80 (mobile TAC sources). Potential risks from traffic emissions generated along these roadways were evaluated using an analysis methodology that considers local traffic conditions, site-specific meteorology, and future exposures.

The air dispersion modeling for the mobile source risk assessment was performed using the U.S. EPA AERMOD dispersion model. AERMOD is a steady-state, multiple-source, Gaussian dispersion model designed for use with emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources (not a factor in this case). AERMOD requires hourly meteorological data consisting of wind vector, wind speed, temperature, stability class, and mixing height. Surface and upper air meteorological data was obtained from CARB. Surface and upper air meteorological data from the Napa County Airport Monitoring Station was selected as being the most representative for meteorology based on proximity to the project site.

The emission sources in the model are line volume sources (comprised of numerous adjacent volume sources) along I-80 as close as 700 feet to the east. An emission rate for PM_{10} (a proxy for DPM) was calculated using traffic volumes from the Traffic Study and an Emission Factor model (EMFAC2017) model run for the Solano County sub-area of the Basin; refer to Appendix C. Heavy-duty vehicle DPM emissions were assigned a release height of 10 feet (3.06 meters) to represent the average stack height for trucks and a plume height of 20 feet (6.12 meters).

AERMOD was run to obtain the peak 1-hour and annual average concentration in micrograms per cubic meter [$\mu g/m^3$] of PM_{10} at the project site. Note that the concentration estimate developed using this methodology is considered conservative and is not a specific prediction of the actual concentrations that would occur at the project site any one point in time. Actual 1-hour and annual average concentrations are dependent on many variables, particularly the number and type of vehicles traveling during time periods of adverse meteorology.

A health risk computation was performed to determine the risk of developing an excess cancer risk calculated on a 30-year exposure scenario with CARB's Hotspot Analysis and Reporting Program Risk Assessment Standalone Tool (HARP 2) software. The cancer risk calculations were based on applying age sensitivity weighting factors for each emissions period modeled. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer-causing TACs. The chronic and carcinogenic health risk calculations are based on the standardized equations contained in the OEHHA Guidance Manual. Only the risk associated with the worst-case location of the proposed project was assessed.

Based on the AERMOD outputs, the highest expected hourly average diesel PM_{10} emission concentrations at the project site would be 0.02 $\mu g/m^3$. The highest expected annual average PM_{10} emission concentrations at the project site would be 0.004 $\mu g/m^3$. The analysis for the project assumed the site would not be occupied until 2023. The highest calculated carcinogenic risk as a result of the project is

3.07 per million for 30-year exposure, which is below the 10 in one million threshold; refer to *Table 4.2-9, Operational Health Risk*. Additionally, acute and chronic hazards would be 0.00 and 0.0007, respectively, which are below the hazard index threshold of 1.0. Therefore, impacts related to cancer risk and hazards from mobile sources would be less than significant at the project site.

OFF-SITE IMPACTS

Proposed Gas Station and Delivery Trucks

The proposed project includes a gasoline dispensing facility, which would be a source of gasoline vapors that would include TACs such as benzene, methyl tertiary-butyl ether, toluene, and xylene. Benzene is the primary TAC associated with gas stations. Additionally, DPM emissions would be emitted from diesel-fueled trucks traveling along the designated delivery truck routes for the Costco warehouse and major retail buildings and emitted from trucks idling at loading docks and truck bays. The gasoline dispensing facility would be located approximately 320 feet northwest of existing residences and 870 feet west of the closest proposed residences.

Gasoline dispensing facility emissions were computed based on the maximum allowable throughput of gasoline (i.e., 36 million gallons per year). Emissions of total organic gases (TOG) and benzene, which is a TAC, were computed using CARB emission factors for gasoline dispensing facilities and assuming that benzene makes up 0.3 percent of gasoline vapor.[11] Total benzene emissions were calculated at 0.018 pounds per hour; refer to Appendix C for the details of the calculations. Pollutant concentrations were then calculated with AERMOD and risk levels were calculated with CARB's HARP 2 program. The results indicate that the risk levels from delivery trucks and fueling operations would not exceed BAAQMD thresholds of 10 in one million cancer risk, 0.3 µg/m^3 annual $PM_{2.5}$ concentration, and hazard index of 1.0 (Table 4.2-9).

Table 4.2-9: Operational Health Risk

Emissions Sources	Concentration (µg/m^3)[1]	Cancer Risk (per million)	Chronic Hazard	Acute Hazard
Delivery Trucks	0.002	1.35	0.0003	0.007
Gas Dispensing Facility	0.078	6.12	0	0
BAAQMD Threshold	*0.3*	*10*	*1.0*	*1.0*
Threshold Exceeded?	**No**	**No**	**No**	**No**

Notes:
1. Concentration for Delivery trucks is $PM_{2.5}$ and concentration for the Gas Dispensing Facility is Benzene.

Cumulative Operational Impacts

In addition to mobile sources, stationary sources within a 1,000-foot-radius of the project site were identified using BAAQMD's Stationary Source Screening Analysis Tools and consultation with BAAQMD.

[11] *CAPCOA. Air Toxics "Hot Spots" Program, Gasoline Service Station Industrywide Risk Assessment Guidelines, November 1997.*

As indicated in *Table 4.2-10: Cumulative Operational Health Risk*, TACs generated from the stationary and mobile sources within a 1,000-foot-radius would not exceed BAAQMD thresholds.

Table 4.2-10: Cumulative Operational Health Risk

Emissions Sources	$PM_{2.5}$ ($\mu g/m^3$)	Cancer Risk (per million)	Chronic Hazard	Acute Hazard
Mobile Sources				
I-80	0.004	3.07	0.0007	0
Stationary Sources				
Proposed Costco (Delivery Trucks and Gas Dispensing Facility)	0.002	7.47	0.0003	0.007
Lee's Market (Gas Dispensing Facility)	0	0.64	0.00067	0
Solano County Fairgrounds (Gas Dispensing Facility)	0	0.2483	0.00122	0
Avery Greene Motors (Coating Operation)	0.005287	0.0026	0.00063	0
Admiral Shell (Gas Dispensing Facility)	0	0.4941	0.00244	0
Bonfare Market #36 ((Gas Dispensing Facility)	0	0.2613	0.00129	0
BAAQMD Individual Project Threshold	*0.3*	*10*	*1.0*	*1.0*
Threshold Exceeded?	**No**	**No**	**No**	**No**
Cumulative Health Risk Values	0.01	12.19	0.01	0.01
BAAQMD Cumulative Threshold	*0.8*	*100*	*10*	*10*
Threshold Exceeded?	**No**	**No**	**No**	**No**

Localized Carbon Monoxide Hotspots

The primary mobile-source criteria pollutant of local concern is carbon monoxide. Concentrations of CO are a direct function of the number of vehicles, length of delay, and traffic flow conditions. Transport of this criteria pollutant is extremely limited; CO disperses rapidly with distance from the source under normal meteorological conditions. Under certain meteorological conditions, however, CO concentrations close to congested intersections that experience high levels of traffic and elevated background concentrations may reach unhealthy levels, affecting nearby sensitive receptors. Areas of high CO concentrations, or "hot spots," are typically associated with intersections that are projected to operate at unacceptable levels of service during the peak commute hours. CO concentration modeling is therefore typically conducted for intersections that are projected to operate at unacceptable levels of service during peak commute hours.

The Basin is designated as attainment for carbon monoxide (CO). Emissions and ambient concentrations of CO have decreased dramatically in the Basin with the introduction of the catalytic converter in 1975. No exceedances of the CAAQS or NAAQS for CO have been recorded at nearby monitoring stations since 1991. As a result, BAAQMD screening criteria notes that CO impacts may be determined to be less than significant if a project is consistent with the applicable congestion management plan (CMP) and would not increase traffic volumes at local intersections to more than 44,000 vehicles per hour, or 24,000 vehicles per hour for locations in heavily urban areas, where "urban canyons" formed by buildings tend

to reduce air circulation. Traffic would increase along surrounding roadways during long-term operational activities.

According to the Traffic Impact Analysis for the project, the entire project would generate a maximum of 394 net new weekday morning peak hour trips, 922-weekday net new mid-day peak hour trips, 1,063 net new evening peak hour trips, and 1,239 net new Saturday peak hour trips. The project traffic study intersection with the highest traffic volumes (Redwood Parkway at I-80 eastbound ramp) would have 5,271 vehicles during the evening peak hour and 5,320 vehicles during the Saturday peak hour. Therefore, the project would not involve intersections with more than 24,000 or 44,000 vehicles per hour. As a result, the project would not exceed BAAQMD's screening criteria, and impacts associated with CO concentrations would be less than significant.

IMPACT AQ-4	***WOULD THE PROJECT RESULT IN OTHER EMISSIONS (SUCH AS THOSE LEADING TO ODORS) ADVERSELY AFFECTING A SUBSTANTIAL NUMBER OF PEOPLE?*** ***(LESS THAN SIGNIFICANT IMPACT)***

CONSTRUCTION ODORS

According to BAAQMD, land uses associated with odor complaints typically include wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. The proposed project does not include any uses identified by BAAQMD as being associated with odors.

Construction activities associated with the project may generate detectable odors from heavy-duty equipment (i.e., diesel exhaust), as well as from architectural coatings and asphalt off-gassing. Odors generated from the referenced sources are common in the man-made environment and are not known to be substantially offensive to adjacent receptors. Any construction-related odors would be short-term in nature and cease upon project completion. As a result, impacts to existing adjacent land uses from construction-related odors would be short-term in duration and therefore would be less than significant.

OPERATIONAL ODORS

BAAQMD has established odor screening thresholds for land uses that have the potential to generate substantial odor complaints, including wastewater treatment plants, landfills or transfer stations, composting facilities, confined animal facilities, food manufacturing, and chemical plants. BAAQMD's thresholds for odors are qualitative based on BAAQMD's Regulation 7, Odorous Substances. This rule

places general limitations on odorous substances and specific emission limitations on certain odorous compounds.[12]

The proposed project may include restaurants in the proposed retail portion of the site. Odors from restaurants usually emanate from charbroilers, griddles, and deep fat fryers. Further, restaurants and other commercial businesses will maintain garbage/recycling areas which are also a source of objectionable odors. Odors are typically regulated under BAAQMD Regulation 1, Rule 1-301, Public Nuisance, which states that no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health, or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. Under BAAQMD's Rule 1-301, a facility that receives three or more violation notices within a 30-day period can be declared a public nuisance.

With respect to odor impacts from adjacent and nearby properties that could affect project residents, land uses typically producing objectionable odors include agricultural uses, wastewater treatment facilities, waste-disposal facilities, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. None of these uses are proposed as part of the project or located near the project site. Impacts would be less than significant.

4.2.5 CONCLUSION

As described above, the proposed project would be consistent with the 2017 Clean Air Plan and would not exceed BAAQMD's construction emissions thresholds with implementation of mitigation. The proposed project would be required to comply with BAAQMD Basic Construction Measures (refer to MM AQ-1) and BAAQMD Additional Construction Mitigation Measures (refer to MM AQ-2) and would be subject to applicable BAAQMD Regulations, such as Regulation 8 Rule 3: Architectural Coatings, Rule 15: Emulsified and Liquid Asphalts, and Regulation 9, Rule 8: Organic Compounds to further reduce specific construction-related emissions. Regulation 6, Rule 3: Wood-Burning Devices would limit emissions from wood-burning devices used for primary heat, supplemental heat or ambiance further reducing operational-related emissions. While project construction emissions would not exceed BAAQMD thresholds, operational NO_X emissions would remain above the corresponding BAAQMD threshold despite implementation of MM GHG-3 through MM GHG-6, MM GHG-8, and MM TR-4. The project's infill development and mix of uses are design features that would reduce mobile source emissions (including NO_X) and would ensure that operational emissions do not exceed BAAQMD thresholds (except of NO_x). However, as the proposed project's operational NO_x emissions would exceed BAAQMD thresholds despite the implementation of project design features and mitigation measures, impacts would be considered significant and unavoidable.

[12] The California Supreme Court in a December 2015 opinion (*California Building Industry Association v. Bay Area Air Quality Management District,* 62 Cal. 4th 369 [No. S 213478]) confirmed that CEQA, with several specific exceptions, is concerned with the impacts of a project on the environment, not the effects the existing environment may have on a project. As such, the analysis of odor impact to potential future residents is provided for informational purposes only.

The highest calculated carcinogenic health risk as a result of the project is 3.07 per million for 30-year exposure, which is below the 10 in one million threshold. Additionally, acute and chronic hazards would be 0.00 and 0.0007, respectively, which are below the hazard index threshold of 1.0. Therefore, impacts related to cancer risk and hazards from mobile sources would be less than significant at the project site.

4.2.6 CUMULATIVE IMPACTS

Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from vehicular traffic that can travel well out of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered would cover an even larger area. Accordingly, the cumulative analysis for a project's air quality analysis must be regional by nature.

BAAQMD CEQA Air Quality Guidelines do not include separate significance thresholds for cumulative operational emissions. However, with respect to regional air pollution, the development of the project would result in population growth that is consistent with the City's General Plan projections, and the GP is consistent with CAP. Therefore, the project would be consistent with the 2017 Clean Air Plan that uses ABAG population forecasts. Additionally, the project includes numerous design features and mitigation measures to reduce VMT. The project proposes commercial and residential land uses (with open space) adjacent to existing residential and commercial uses and within three miles to downtown Vallejo. The proposed project also incorporates sidewalks, paseos, and a trail designed to promote a pedestrian- and bicycle-friendly environment; to encourage alternative transportation between the commercial and residential project elements; and, improve access to the proposed open space. MM GHG-3 (Chapter 4.6, Greenhouse Gas) would also implement a Transportation Demand Management (TDM) program for residential and non-residential uses to decrease the dependence on single-occupant vehicles and facilitate the use of transit.

As described in Impact Statement AQ-1, above, the project would also be consistent with the appropriate 2017 Clean Air Plan control measures, which are provided to reduce air quality emissions for the entire Bay Area region. However, the discussion in Impact Statement AQ-2 shows that NO_X emissions would exceed BAAQMD operational thresholds despite mitigation, which would also trigger a cumulative impact. BAAQMD CEQA Air Quality Guidelines note that the nature of air emissions is largely a cumulative impact. Although no single project is sufficient in size by itself to result in nonattainment of ambient air quality standards, the project's individual emissions would potentially contribute to existing cumulatively significant adverse air quality impacts. Consistency with the 2017 Clean Air Plan control measures would help mitigate these effects. However, as operational NO_X emissions would be exceeded, cumulative impacts would be considered significant and unavoidable.

4.2.7 REFERENCES

Bay Area Air Quality Management District, *Planning Healthy Places*, 2016.

Bay Area Air Quality Management District, *CEQA Air Quality Guidelines,* 2017.

Bay Area Air Quality Management District, *Clean Air Plan*, 2017.

Bay Area Air Quality Management District, *Air Quality Standards and Attainment Status,* 2017.

Bay Area Air Quality Management District, *Current Rules*, 2017.

California Air Pollution Control Officers Association (CAPCOA), *Health Risk Assessments for Proposed Land Use Projects*, 2009.

California Air Resources Board (CARB), *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, 2000.

California Air Resources Board (CARB), *Air Quality and Land Use Handbook: A Community Health Perspective*, 2005.

California Air Resources Board (CARB), *Current Air Quality Standards*, 2016.

California Air Resources Board (CARB), *Aerometric Data Analysis and Measurement System (ADAM) Top Four Summaries from 2014 to 2016*, 2018.

City of Vallejo, *Propel Vallejo General Plan Update*, 2017.

City of Vallejo, *2015-2023 Housing Element Update,* 2015.

Federal Highway Administration*, Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents,* 2016.

Office of Environmental Health Hazard Assessment (OEHHA), *Air Toxics Hot Spots Program Risk Assessment Guidelines*, 2015

Transportation Impact Analysis, Fehr and Peers (2019).

United States Environmental Protection Agency (U.S. EPA), *NAAQS Table*, 2016.

United States Environmental Protection Agency (U.S. EPA), *Policy Assessment for the Review of the Lead National Ambient Air Quality Standards*, 2013.

U.S. EPA, 2017. *Air Quality Dispersion Modeling Screening Models*. Available online at: https://www.epa.gov/scram/air-quality-dispersion-modeling-screening-models

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