4.3 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

4.3.1 INTRODUCTION

The Air Quality and Greenhouse Gas Emissions chapter of this EIR describes the effects of the proposed project on local and regional air quality. The chapter includes a discussion of the existing air quality and greenhouse gas (GHG) setting, construction-related air quality impacts resulting from grading and equipment emissions, direct and indirect emissions associated with the project, the impacts of these emissions on both the local and regional scale, and mitigation measures warranted to reduce or eliminate any identified significant impacts. The chapter relies on information obtained from the *City of Antioch General Plan*[1] and associated EIR,[2] the California Emissions Estimator Model (CalEEMod) version 2016.3.1,[3] and is primarily based on information, guidance, and analysis protocol provided by the Bay Area Air Quality Management District (BAAQMD).

4.3.2 EXISTING ENVIRONMENTAL SETTING

The following information provides an overview of the existing environmental setting in relation to air quality within the proposed project area. Air basin characteristics, ambient air quality standards (AAQS), attainment status and regional air quality plans, local air quality monitoring, odors, sensitive receptors, and greenhouse gases are discussed.

Air Basin Characteristics

The project site is located in the eastern portion of the nine-county San Francisco Bay Area Air Basin (SFBAAB), and is within the jurisdictional boundaries of the BAAQMD. The SFBAAB consists of coastal mountain ranges, inland valleys, and bays. The proposed project is located on the south side of the San Joaquin River delta, east of the Carquinez Strait, and would be considered to be within the Carquinez Strait region of the SFBAAB. Being located between the greater Bay Area and the Central Valley has great influence on the climate and air quality of the area. During the summer and fall months, marine air is drawn eastward through the Carquinez Strait, with common wind speeds of 15 to 20 miles per hour throughout the region. The general west-to-east flow of the winds in the straits tends to move pollutants east. Thus, the winds dilute pollutants and transport them away from the area, so that emissions released in the project area have more influence on air quality in the Sacramento and San Joaquin Valleys than locally. However, stationary sources located in upwind cities could influence the local air quality.

1 City of Antioch. *City of Antioch General Plan*. Updated November 24, 2003.
2 City of Antioch. *Draft General Plan Update Environmental Impact Report*. July 2003.
3 ENVIRON International Corporation and the California Air Districts. *California Emissions Estimator Model User's Guide Version 2016.3.1*. September 2017.

Average daily maximum temperatures (in degrees Fahrenheit) are in the mid to high 50s in the winter and the high 80s in the summer. Average minimum temperatures are in the high 30s to low 40s in the winter and the mid-50s in the summer. Rainfall amounts in the region vary from 14.4 inches annually in Antioch to 22 inches annually in Fairfield.

Ambient Air Quality Standards

Both the U.S. Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) have established ambient air quality standards for common pollutants. The federal standards are divided into primary standards, which are designed to protect the public health, and secondary standards, which are designed to protect the public welfare. The ambient air quality standards for each contaminant represent safe levels that avoid specific adverse health effects. Pollutants for which air quality standards have been established are called "criteria" pollutants. Table 4.3-1 identifies the major pollutants, characteristics, health effects and typical sources. The federal and California ambient air quality standards (NAAQS and CAAQS, respectively) are summarized in Table 4.3-2. The NAAQS and CAAQS were developed independently with differing purposes and methods. As a result, the federal and State standards differ in some cases. In general, the State of California standards are more stringent, particularly for ozone and particulate matter (PM), than the federal standards.

A description of each criteria pollutant and the potential health effects related to each pollutant is provided in the following section.

Table 4.3-1
Summary of Criteria Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone	A highly reactive gas produced by the photochemical process involving a chemical reaction between the sun's energy and other pollutant emissions. Often called photochemical smog.	• Eye irritation • Wheezing, chest pain, dry throat, headache, or nausea • Aggravated respiratory disease such as emphysema, bronchitis, and asthma	Combustion sources such as factories, automobiles, and evaporation of solvents and fuels.
Carbon Monoxide	An odorless, colorless, highly toxic gas that is formed by the incomplete combustion of fuels.	• Impairment of oxygen transport in the bloodstream • Impaired vision, reduced alertness, chest pain, and headaches • Can be fatal in the case of very high concentrations	Automobile exhaust, combustion of fuels, and combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide	A reddish-brown gas that discolors the air and is formed during combustion of fossil fuels under high temperature and pressure.	• Lung irrigation and damage • Increased risk of acute and chronic respiratory disease	Automobile and diesel truck exhaust, industrial processes, and fossil-fueled power plants.

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Sulfur Dioxide	A colorless, irritating gas with a rotten egg odor formed by combustion of sulfur-containing fossil fuels.	• Aggravation of chronic obstruction lung disease • Increased risk of acute and chronic respiratory disease	Diesel vehicle exhaust, oil-powered power plants, and industrial processes.
Particulate Matter (PM_{10} and $PM_{2.5}$)	A complex mixture of extremely small particles and liquid droplets that can easily pass through the throat and nose and enter the lungs.	• Aggravation of chronic respiratory disease • Heart and lung disease • Coughing • Bronchitis • Chronic respiratory disease in children • Irregular heartbeat • Nonfatal heart attacks	Combustion sources such as automobiles, power generation, industrial processes, and wood burning. Also from unpaved roads, farming activities, and fugitive windblown dust.
Lead	A metal found naturally in the environment as well as in manufactured products.	• Loss of appetite, weakness, apathy, and miscarriage • Lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract	Industrial sources and combustion of leaded aviation gasoline.

Sources:

- *California Air Resources Board. California Ambient Air Quality Standards (CAAQS). Available at: http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed March 2017.*
- *Sacramento Metropolitan, El Dorado, Feather River, Placer, and Yolo-Solano Air Districts. Spare the Air website. Air Quality Information for the Sacramento Region. Available at: http://www.sparetheair.com/health.cfm?page=healthoverall. Accessed March 2017.*
- *California Air Resources Board. Glossary of Air Pollution Terms. Available at: http://www.arb.ca.gov/html/gloss.htm. Accessed March 2017.*

Table 4.3-2
Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS	
			Primary	Secondary
Ozone	1 Hour	0.09 ppm	-	Same as primary
	8 Hour	0.070 ppm	0.070 ppm	
Carbon Monoxide	8 Hour	9 ppm	9 ppm	-
	1 Hour	20 ppm	35 ppm	
Nitrogen Dioxide	Annual Mean	0.030 ppm	53 ppb	Same as primary
	1 Hour	0.18 ppm	100 ppb	-
Sulfur Dioxide	24 Hour	0.04 ppm	-	-
	3 Hour	-	-	0.5 ppm
	1 Hour	0.25 ppm	75 ppb	-
Respirable Particulate Matter (PM_{10})	Annual Mean	20 ug/m^3	-	Same as primary
	24 Hour	50 ug/m^3	150 ug/m^3	
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	12 ug/m^3	12 ug/m^3	15 ug/m^3
	24 Hour	-	35 ug/m^3	Same as primary
Lead	30 Day Average	1.5 ug/m^3	-	-
	Calendar Quarter	-	1.5 ug/m^3	Same as primary

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Table 4.3-2
Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS	
			Primary	Secondary
Sulfates	24 Hour	25 ug/m^3	-	-
Hydrogen Sulfide	1 Hour	0.03 ppm	-	-
Vinyl Chloride	24 Hour	0.010 ppm	-	-
Visibility Reducing Particles[1]	8 Hour	see note below	-	-

ppm = parts per million
ppb = parts per billion
µg/m^3 = micrograms per cubic meter

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

Source: California Air Resources Board. Ambient Air Quality Standards. May 4, 2016. Available at: https://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed November 2017.

Ozone

Ozone is a reactive gas consisting of three oxygen atoms. In the troposphere, ozone is a product of the photochemical process involving the sun's energy, and is a secondary pollutant formed as a result of a complex chemical reaction between reactive organic gases (ROG) and oxides of nitrogen (NO_X) emissions in the presence of sunlight. As such, unlike other pollutants, ozone is not released directly into the atmosphere from any sources. In the stratosphere, ozone exists naturally and shields Earth from harmful incoming ultraviolet radiation. The primary source of ozone precursors is mobile sources, including cars, trucks, buses, construction equipment, and agricultural equipment.

Ground-level ozone reaches the highest level during the afternoon and early evening hours. High levels occur most often during the summer months. Ground-level ozone is a strong irritant that could cause constriction of the airways, forcing the respiratory system to work harder in order to provide oxygen. Ozone at the Earth's surface causes numerous adverse health effects and is a major component of smog. High concentrations of ground-level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments.

Reactive Organic Gas

ROG is a reactive chemical gas composed of hydrocarbon compounds typically found in paints and solvents that contributes to the formation of smog and ozone by involvement in atmospheric chemical reactions. A separate health standard does not exist for ROG. However, some compounds that make up ROG are toxic, such as the carcinogen, benzene.

Oxides of Nitrogen

NO_X are a family of gaseous nitrogen compounds and are precursors to the formation of ozone and particulate matter. The main NO_X compound of concern, nitrogen dioxide (NO_2), is a reddish-brown gas that discolors the air and is toxic at high concentrations. NO_X results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of NO_X. NO_X reacts with ROG to form smog, which could result in adverse impacts to human health, damage the environment, and cause poor visibility. Additionally, NO_X emissions are a major component of acid rain. Health effects related to NO_X include lung irritation, lung damage, and increased risk of acute and chronic respiratory disease.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, poisonous gas produced by incomplete burning of carbon-based fuels such as gasoline, oil, and wood. When CO enters the body, the CO combines with chemicals in the body, which prevents blood from carrying oxygen to cells, tissues, and organs. Symptoms of exposure to CO can include problems with vision, reduced alertness, and general reduction in mental and physical functions. Exposure to CO can result in chest pain, headaches, reduced mental alertness, and death at high concentrations.

Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless, irritating gas with a rotten egg odor formed primarily by the combustion of sulfur-containing fossil fuels from mobile sources, such as locomotives, ships, and off-road diesel equipment. SO_2 is also emitted from several industrial processes, such as petroleum refining and metal processing. Similar to airborne NO_X, suspended sulfur dioxide particles contribute to poor visibility. The sulfur dioxide particles are also a component of particulate matter, discussed below.

Particulate Matter

Particulate matter, also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health impacts. The USEPA is concerned about particles that are 10 micrometers in diameter or smaller (PM_{10}) because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, the particles could affect the heart and lungs and cause serious health effects. USEPA groups particle pollution into three categories based on their size and where they are deposited:

- "Inhalable coarse particles ($PM_{2.5-10}$)," which are found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.
- "Fine particles ($PM_{2.5}$)," which are found in smoke and haze, are 2.5 micrometers in diameter and smaller. $PM_{2.5}$ particles could be directly emitted from sources such as forest

fires, or could form when gases emitted from power plants, industries, and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.

- "Ultrafine particles (UFP)," which are very, very small particles (less than 0.1 micrometers in diameter) largely resulting from the combustion of fossil fuels, meat, wood, and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, their high surface area, deep lung penetration, and transfer into the bloodstream could result in disproportionate health impacts relative to their mass. UFP is not currently regulated separately, but is analyzed as part of $PM_{2.5}$.

PM_{10}, $PM_{2.5-10}$, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} sources include the same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust. Long-term PM pollution, especially fine particles, could result in significant health problems including, but not limited to, the following: increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing; decreased lung function; aggravated asthma; development of chronic respiratory disease in children; development of chronic bronchitis or obstructive lung disease; irregular heartbeat; heart attacks; and increased blood pressure.

Lead

Lead is a relatively soft and chemically resistant metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, and, thus, essentially persists forever. Lead forms compounds with both organic and inorganic substances. As an air pollutant, lead is present in small particles. Sources of lead emissions in California include a variety of industrial activities. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically. However, because lead was emitted in large amounts from vehicles when leaded gasoline was used, lead is present in many soils (especially urban soils) and could become re-suspended into the air.

Because lead is only slowly excreted by the human body, exposures to small amounts of lead from a variety of sources could accumulate to harmful levels. Effects from inhalation of lead near the level of the ambient air quality standard include impaired blood formation and nerve conduction. Lead can adversely affect the nervous, reproductive, digestive, immune, and blood-forming systems. Symptoms could include fatigue, anxiety, short-term memory loss, depression, weakness in the extremities, and learning disabilities in children. Lead also causes cancer.

Sulfates

Sulfates are the fully oxidized ionic form of sulfur and are colorless gases. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. The sulfur is oxidized to SO_2 during the combustion process and subsequently

converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The sulfates standard established by CARB is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, because they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide

Hydrogen Sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations, especially in enclosed spaces (800 ppm can cause death).

Vinyl Chloride

Vinyl chloride (C_2H_3Cl, also known as VCM) is a colorless gas that does not occur naturally, but is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC), which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Visibility Reducing Particles

Visibility reducing particles are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The 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.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are also a category of environmental concern. TACs are present in many types of emissions with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Car and truck exhaust contains at least 40 different TACs. In terms of health risks, the most volatile contaminants are diesel particulate matter (DPM), benzene, formaldehyde, 1,3-butadiene and acetaldehyde. Gasoline vapors contain several TACs, including benzene, toluene, and xylenes. Public exposure to TACs can result from emissions from normal operations as well as accidental releases.

Health risks from TACs are a function of both the concentration of emissions and the duration of exposure, which typically are associated with long-term exposure and the associated risk of contracting cancer. Health effects of exposure to TACs other than cancer include birth defects,

neurological damage, and death. Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level. The identification, regulation, and monitoring of TACs is relatively new compared to that for criteria air pollutants that have established AAQS. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an AAQS or emission-based threshold.

Attainment Status and Regional Air Quality Plans

Areas not meeting the national AAQS (NAAQS) presented in Table 4.3-2 above are designated by the USEPA as nonattainment. Further classifications of nonattainment areas are based on the severity of the nonattainment problem, with marginal, moderate, serious, severe, and extreme nonattainment classifications for ozone. Nonattainment classifications for PM range from marginal to serious. The Federal Clean Air Act (FCAA) requires areas violating the NAAQS to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The SIP contains the strategies and control measures for states to use to attain the NAAQS. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, rules, and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA reviews SIPs to determine if they conform to the mandates of the FCAA amendments and would achieve air quality goals when implemented.

The CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA) of 1988. The CCAA classifies ozone nonattainment areas as moderate, serious, severe, and extreme based on severity of violations of the California AAQS (CAAQS). For each nonattainment area classification, the CCAA specifies air quality management strategies that must be adopted. For all nonattainment areas, attainment plans are required to demonstrate a five-percent-per-year reduction in nonattainment air pollutants or their precursors, averaged every consecutive three-year period, unless an approved alternative measure of progress is developed. Air districts with air quality that is in violation of CAAQS are required to prepare an air quality attainment plan that lays out a program to attain the CCAA mandates.

Table 4.3-3 presents the current attainment status of the SFBAAB, including Contra Costa County. As shown in the table, the area is currently designated as a nonattainment area for the State and federal ozone, State and federal $PM_{2.5}$, and State PM_{10} standards. The SFBAAB is designated attainment or unclassified for all other AAQS.

In compliance with the FCAA and CCAA, the BAAQMD periodically prepares and updates air quality plans that provide emission reduction strategies to achieve attainment of the AAQS, including control strategies to reduce air pollutant emissions through regulations, incentive programs, public education, and partnerships with other agencies. The current air quality plans were prepared in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

Table 4.3-3
Contra Costa County Attainment Status Designations

Pollutant	Averaging Time	California Standards	Federal Standards
Ozone	1 Hour	Nonattainment	-
	8 Hour	Nonattainment	Nonattainment
Carbon Monoxide	8 Hour	Attainment	Attainment
	1 Hour	Attainment	Attainment
Nitrogen Dioxide	Annual Mean	-	Attainment
	1 Hour	Attainment	Unclassified
Sulfur Dioxide	Annual Mean	-	Attainment
	24 Hour	Attainment	Attainment
	3 Hour	-	Unclassified
	1 Hour	Attainment	Attainment
Respirable Particulate Matter (PM_{10})	Annual Mean	Nonattainment	-
	24 Hour	Nonattainment	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	Nonattainment	Unclassified / Attainment
	24 Hour	-	Nonattainment
Sulfates	24 Hour	Attainment	-
Lead	30 Day Average	-	Attainment
	Calendar Quarter	-	Attainment
	Rolling 3-Month Average	-	Attainment
Hydrogen Sulfide	1 Hour	Unclassified	-
Vinyl Chloride	24 Hour	Unclassified	-

Source: Bay Area Air Quality Management District. Air Quality Standards and Attainment Status. Available at: http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status. Accessed July 2017.

The most recent federal ozone plan is the 2001 Ozone Attainment Plan, which is a proposed revision to the Bay Area part of the SIP to achieve the federal ozone standard.[4] The plan was adopted on October 24, 2001 and approved by the CARB on November 1, 2001.

The most recent State ozone plan is the 2017 Clean Air Plan (CAP), adopted on April 19, 2017.[5] The 2017 CAP was developed as a multi-pollutant plan that provides an integrated control strategy to reduce ozone, PM, TACs, and GHGs. The control strategies included in the 2017 CAP serve as the backbone of the 2017 CAP, and build upon existing regional, state, and national programs for emissions reductions. The 2017 CAP includes 85 control measures, which provide an integrative approach to reducing ozone, PM, TAC, and GHG emissions.

The aforementioned air quality plans contain mobile source controls, stationary source controls, and transportation control measures to be implemented in the region to attain the State and federal standards within the SFBAAB. The plans are based on population and employment projections provided by local governments, usually developed as part of the General Plan update process.

[4] Bay Area Air Quality Management District. *Air Quality Plans*. Available at: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans.aspx. Accessed March 2017.

[5] *Ibid.*

Local Air Quality Monitoring

Air quality is monitored by BAAQMD and CARB at various locations in the region that provide information on ambient concentrations of criteria air pollutants and TACs to help determine which air quality standards are being violated, and to direct the BAAQMD emission reduction efforts, such as developing attainment plans and rules, incentive programs, etc. The proposed project site is located nearest to the Bethel Island Road monitoring site, which is located nearly seven miles northeast of the project site at 5551 Bethel Island Road. Data for $PM_{2.5}$, was not available for the Bethel Island Road monitoring site; thus, such data was obtained from the next nearest monitoring site, which is the Concord monitoring site located approximately 14.5 miles west of the project site at 2975 Treat Boulevard. Table 4.3-4 shows historical occurrences of pollutant levels exceeding the State and federal AAQS for the three-year period from 2014 to 2016. The number of days that each standard was exceeded is presented in the tables as well. As shown in the table, the State AAQS and the federal 8-hour AAQS for ozone were exceeded. In addition, the State PM_{10} and State and federal $PM_{2.5}$ AAQS were exceeded. All other State and federal AAQS were met in the area.

Table 4.3-4
Air Quality Data Summary for the Bethel Island Road Air Quality Monitoring Site (2014-2016)

Pollutant	Standard	Days Standard Was Exceeded		
		2014	2015	2016
1-Hour Ozone	State	0	0	0
	Federal	0	0	0
8-Hour Ozone	State	1	1	2
	Federal	1	2	2
24-Hou PM_{10}	State	1	0	0
	Federal	0	0	0
24-Hour $PM_{2.5}$*	Federal	0	0	0
1-Hour Nitrogen Dioxide	State	0	0	0
	Federal	0	0	0

* Data obtained from the Concord monitoring site.

Source: California Air Resources Board, Aerometric Data Analysis and Management (iADAM) System, http://www.arb.ca.gov/adam/topfour/topfour1.php, accessed September and November 2017.

Odors

While offensive odors rarely cause physical harm, they can be unpleasant, leading to considerable annoyance and distress among the public and can generate citizen complaints to local governments and air districts. Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, quantitative or formulaic methodologies to determine the presence of a significant odor impact do not exist. Adverse effects of odors on residential areas and other sensitive receptors warrant the closest scrutiny; but consideration should also be given to other land use types where people congregate, such as recreational facilities, worksites, and commercial areas. The potential for an odor impact is

dependent on a number of variables including the nature of the odor source, distance between a receptor and an odor source, and local meteorological conditions.

One of the most important factors influencing the potential for an odor impact to occur is the distance between the odor source and receptors, also referred to as a buffer zone or setback. The greater the distance between an odor source and receptor, the less concentrated the odor emission would be when reaching the receptor.

Meteorological conditions also affect the dispersion of odor emissions, which determines the exposure concentration of odiferous compounds at receptors. The predominant wind direction in an area influences which receptors are exposed to the odiferous compounds generated by a nearby source. Receptors located upwind from a large odor source may not be affected due to the produced odiferous compounds being dispersed away from the receptors. Wind speed also influences the degree to which odor emissions are dispersed away from any area.

Odiferous compounds could be generated from a variety of source types including both construction and operational activities. Examples of common land use types that typically generate significant odor impacts include, but are not limited to, wastewater treatment plants; composting/green waste facilities; recycling facilities; petroleum refineries; chemical manufacturing plants; painting/coating operations; rendering plants; and food packaging plants. The proposed project does not include the construction or operation of any such land uses.

Although less common, diesel fumes associated with substantial diesel-fueled equipment and heavy-duty trucks, such as from construction activities, freeway traffic, or distribution centers, can be found to be objectionable. Existing nearby sensitive receptors could be subjected to diesel fumes associated with construction of the project.

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others, due to the types of population groups or activities involved. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and/or duration of exposure to air pollutants. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. The BAAQMD defines sensitive receptors as facilities where sensitive receptor population groups (i.e., children, the elderly, the acutely ill, and the chronically ill) are likely to be located. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics. The proposed project involves the creation of new housing, including potential housing for seniors; thus, would introduce new sensitive receptors to the area. Accordingly, the proposed project would be considered a sensitive receptor.

The residences to the north of the project site, as well as the Kaiser Permanente Medical Center to the, east would be considered the nearest existing sensitive receptors to the project site. In addition to the foregoing receptors, the Dozier-Libbey Medical High School is located to the east of the Kaiser Permanente Medical Center; however, the high school is separated from the project site by

over a half mile. It should be noted that the areas to the east, south, and west of the site are anticipated for future residential and mixed use, medical development per the City's General Plan.

Greenhouse Gases

GHGs are gases that absorb and emit radiation within the thermal infrared range, trapping heat in the earth's atmosphere. Some GHGs occur naturally and are emitted into the atmosphere through both natural processes and human activities. Other GHGs are created and emitted solely through human activities. The principal GHGs that enter the atmosphere due to human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated carbons. Other common GHGs include water vapor, ozone, and aerosols. Since the beginning of the Industrial Revolution, global atmospheric concentrations of GHGs have increased due to human activities such as the burning of fossil fuels, clearing of forests and other activities. The increase in atmospheric concentrations of GHG due to human activities has resulted in more heat being held within the atmosphere, which is the accepted explanation for global climate change.[6]

The primary GHG emitted by human activities is CO_2, with the next largest components being CH_4 and N_2O. The primary sources of CH_4 emissions include domestic livestock sources, decomposition of wastes in landfills, releases from natural gas systems, coal mine seepage, and manure management. The main human activities producing N_2O are agricultural soil management, fuel combustion in motor vehicles, nitric acid production, manure management, and stationary fuel combustion. Emissions of GHG by economic sector indicate that energy-related activities account for the majority of U.S. emissions. Electricity generation is the largest single-source of GHG emissions, and transportation is the second largest source, followed by industrial activities. The agricultural, commercial, and residential sectors account for the remainder of GHG emission sources.[7] Emissions of GHG are partially offset by uptake of carbon and sequestration in forests, trees in urban areas, agricultural soils, landfilled yard trimmings and food scraps, and absorption of CO_2 by the earth's oceans; however, the rate of emissions of GHGs currently outpaces the rate of uptake, thus causing global atmospheric concentrations to increase.[8] Attainment concentration standards for GHGs have not been established by the federal or State government.

Global Warming Potential

Global Warming Potential (GWP) is one type of simplified index (based upon radiative properties) that can be used to estimate the potential future impacts of emissions of various gases. According to the USEPA, the global warming potential of a gas, or aerosol, to trap heat in the atmosphere is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas." The reference gas for comparison is

[6] U.S. Environmental Protection Agency. *Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases*. Available at: https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases. Accessed November 17, 2016.

[7] U.S. Environmental Protection Agency. *Sources of Greenhouse Gas Emissions.* Available at: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions. Accessed November 2017.

[8] U.S. Environmental Protection Agency. *Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases.* Available at: https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases. Accessed November 17, 2016.

CO_2. GWP is based on a number of factors, including the heat-absorbing ability of each gas relative to that of CO_2, as well as the decay rate of each gas relative to that of CO_2. Each gas's GWP is determined by comparing the radiative forcing associated with emissions of that gas versus the radiative forcing associated with emissions of the same mass of CO_2, for which the GWP is set at one. Methane gas, for example, is estimated by the USEPA to have a comparative global warming potential 25 times greater than that of CO_2, as shown in Table 4.3-5.

Table 4.3-5
Global Warming Potentials and Atmospheric Lifetimes of Select GHGs

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide (CO_2)	50-200[1]	1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

1. For a given amount of carbon dioxide emitted, some fraction of the atmospheric increase in concentration is quickly absorbed by the oceans and terrestrial vegetation, some fraction of the atmospheric increase will only slowly decrease over a number of years, and a small portion of the increase will remain for many centuries or more.

Source: USEPA. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013. April 15, 2017.

As shown in the table, at the extreme end of the scale, sulfur hexafluoride is estimated to have a comparative GWP 22,800 times that of CO_2. The "specified time horizon" is related to the atmospheric lifetimes of such GHGs, which are estimated by the USEPA to vary from 50 to 200 years for CO_2, to 50,000 years for tetrafluoromethane. Longer atmospheric lifetimes allow GHG to buildup in the atmosphere; therefore, longer lifetimes correlate with the global warming potential of a gas. The common indicator for GHG is expressed in terms of metric tons of CO_2 equivalents ($MTCO_2e$).

Effects of Global Climate Change

Uncertainties exist as to exactly what the climate changes will be in various local areas of the Earth. According to the Intergovernmental Panel on Climate Change's Working Group II Report, *Climate Change 2007: Impacts, Adaptation and Vulnerability*,[9] as well as the California Natural Resources Agency's report *Safeguarding California: Reducing Climate Risk*[10] climate change impacts to California may include:

9 Intergovernmental Panel on Climate Change. *Climate Change 2007: Impacts, Adaptation, and Vulnerability.* 2007.

10 California Natural Resources Agency. *Safeguarding California: Reducing Climate Risk.* July 2014.

- Increasing evaporation;
- Rearrangement of ecosystems as species and ecosystems shift northward and to higher elevations;
- Increased frequency, duration, and intensity of conditions conducive to air pollution formation (particularly ozone);
- Reduced precipitation, changes to precipitation and runoff patterns, reduced snowfall (precipitation occurring as rain instead of snow), earlier snowmelt, decreased snowpack, and increased agricultural demand for water;
- Increased experiences of heat waves;
- Increased growing season and increased growth rates of weeds, insect pests and pathogens;
- Inundation by sea level rise, and exacerbated shoreline erosion; and
- Increased incidents and severity of wildfire events and expansion of the range and increased frequency of pest outbreaks.

4.3.3 REGULATORY CONTEXT

Air quality is regulated through the efforts of various international regulations and federal, State, regional, and local government agencies. The agencies work jointly and individually to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for regulating and improving the air quality within the project area are discussed below.

Federal Regulations

The most prominent federal regulation is the FCAA, which is implemented and enforced by the USEPA.

FCAA and USEPA

The FCAA requires the USEPA to set NAAQS and designate areas with air quality not meeting NAAQS as nonattainment. The USEPA is responsible for enforcement of NAAQS for atmospheric pollutants and regulates emission sources that are under the exclusive authority of the federal government including emissions of GHGs. The USEPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990.

The EPA has adopted policies consistent with FCAA requirements demanding states to prepare SIPs that demonstrate attainment and maintenance of the NAAQS. The 1990 amendments of the FCAA added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The USEPA has responsibility to review all state SIPs to determine conformance to the mandates of the FCAA, and the amendments thereof, and determine if implementation would achieve air quality goals. If the USEPA determines a SIP to be inadequate, a Federal Implementation Plan may be prepared for the nonattainment area that

imposes additional control measures. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may result in sanctions to transportation funding and stationary air pollution sources in the air basin.

The USEPA has developed regulations to address the GHG emissions of cars and trucks, primarily through the use of fuel economy standards for light-duty vehicles.[11] The Mandatory Reporting of Greenhouse Gases Rule requires reporting of GHG emissions from large sources and suppliers in the U.S., and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHG, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the USEPA.

To track the national trend in emissions and removals of GHG since 1990, USEPA develops the official U.S. GHG inventory each year. The national GHG inventory is submitted to the United Nations in accordance with the United Nations Framework Convention on Climate Change (UNFCCC).

On December 7, 2009, USEPA issued findings under Section 202(a) of the FCAA concluding that GHGs are pollutants that could endanger public health. Under the so-called Endangerment Finding, USEPA found that the current and projected concentrations of the six key well-mixed GHGs – CO_2, CH_4, N_2O, PFCs, SF_6, and HFCs – in the atmosphere threaten the public health and welfare of current and future generations. These findings do not, by themselves, impose any requirements on industry or other entities.

State Regulations

California has adopted a variety of regulations aimed at reducing air pollution and GHG emissions. The adoption and implementation of the key State legislation described in further detail below demonstrates California's leadership in addressing air quality. Only the most prominent and applicable California air quality- and GHG-related legislation are included below; however, an exhaustive list and extensive details of California air quality legislation can be found at the CARB website.[12]

State Regulations Related to Air Quality

The following regulations address air quality within California.

CCAA and CARB

The CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the CCAA. The CCAA requires that air

[11] U.S. Environmental Protection Agency. *Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks.* Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-passenger-cars-and. Accessed November 2017.

[12] California Air Resources Board. *Laws and Regulations*. Available at: https://www.arb.ca.gov/html/lawsregs.htm. Accessed November 2017.

quality plans be prepared for areas of the State that have not met the CAAQS for ozone, CO, NO_X, and SO_2. Among other requirements of the CCAA, the plans must include a wide range of implementable control measures, which often include transportation control measures and performance standards. In order to implement the transportation-related provisions of the CCAA, local air pollution control districts have been granted explicit authority to adopt and implement transportation controls. The CARB, California's air quality management agency, regulates and oversees the activities of county air pollution control districts and regional air quality management districts. The CARB regulates local air quality indirectly using State standards and vehicle emission standards, by conducting research activities, and through planning and coordinating activities. In addition, the CARB has primary responsibility in California to develop and implement air pollution control plans designed to achieve and maintain the NAAQS established by the USEPA. Furthermore, the CARB is charged with developing rules and regulations to cap and reduce GHG emissions.

Air Quality and Land Use Handbook

CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB Handbook) addresses the importance of considering health risk issues when siting sensitive land uses, including residential development, in the vicinity of intensive air pollutant emission sources including freeways or high-traffic roads, distribution centers, ports, petroleum refineries, chrome plating operations, dry cleaners, and gasoline dispensing facilities.[13] The CARB Handbook draws upon studies evaluating the health effects of traffic traveling on major interstate highways in metropolitan California centers within Los Angeles (I-405 and I-710), the San Francisco Bay, and San Diego areas. The recommendations identified by CARB, including siting residential uses a minimum distance of 500 feet from freeways or other high-traffic roadways, are consistent with those adopted by the State of California for location of new schools. Specifically, the CARB Handbook recommends, "Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day" (CARB 2005).

Importantly, the Introduction section of the CARB Handbook clarifies that the guidelines are strictly advisory, recognizing that: "[l]and use decisions are a local government responsibility. The Air Resources Board Handbook is advisory and these recommendations do not establish regulatory standards of any kind." CARB recognizes that there may be land use objectives as well as meteorological and other site-specific conditions that need to be considered by a governmental jurisdiction relative to the general recommended setbacks, specifically stating, "[t]hese recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues" (CARB 2005).

[13] California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005.

Assembly Bill 1807

Assembly Bill (AB) 1807, enacted in September 1983, sets forth a procedure for the identification and control of TACs in California. CARB is responsible for the identification and control of TACs, except pesticide use, which is regulated by the California Department of Pesticide Regulation.

AB 2588

The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588), California Health and Safety Code Section 44300 et seq., provides for the regulation of over 200 TACs, including DPM, and is the primary air contaminant legislation in California. Under the act, local air districts may request that a facility account for its TAC emissions. Local air districts then prioritize facilities on the basis of emissions, and high priority designated facilities are required to submit a health risk assessment and communicate the results to the affected public.

Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations

In 2002, the Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (Title 17, Section 93105, of the California Code of Regulations) went into effect, which requires each air pollution control and air quality management district to implement and enforce the requirements of Section 93105 and propose their own asbestos ATCM as provided in Health and Safety Code section 39666(d).[14]

Senate Bill 656

In 2003, the Legislature passed Senate Bill (SB) 656 to reduce public exposure to PM_{10} and $PM_{2.5}$ above the State CAAQS. The legislation requires the CARB, in consultation with local air pollution control and air quality management districts, to adopt a list of the most readily available, feasible, and cost-effective control measures that could be implemented by air districts to reduce PM_{10} and $PM_{2.5}$ emissions. The CARB list is based on California rules and regulations existing as of January 1, 2004, and was adopted by CARB in November 2004. Categories addressed by SB 656 include measures for reduction of emissions associated with residential wood combustion and outdoor greenwaste burning, fugitive dust sources such as paved and unpaved roads and construction, combustion sources such as boilers, heaters, and charbroiling, solvents and coatings, and product manufacturing. Some of the measures include, but are not limited to, the following:

- Reduce or eliminate wood-burning devices allowed;
- Prohibit residential open burning;
- Permit and provide performance standards for controlled burns;
- Require water or chemical stabilizers/dust suppressants during grading activities;
- Limit visible dust emissions beyond the project boundary during construction;

[14] California Air Resources Board. *2002-07-29 Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations*. June 3, 2015. Available at: http://www.arb.ca.gov/toxics/atcm/asb2atcm.htm. Accessed August 2016.

- Require paving/curbing of roadway shoulder areas; and
- Require street sweeping.

Under SB 656, each air district is required to prioritize the measures identified by CARB, based on the cost effectiveness of the measures and their effect on public health, air quality, and emission reductions. Per SB 656 requirements, the BAAQMD amended their Regulation 6, Rule 3 related to wood-burning appliances to include conditions consistent with SB 656, including such conditions as the prohibition of the installation of any new, permanently installed, indoor or outdoor, uncontrolled wood-burning appliances.

Heavy-Duty Vehicle Idling Emission Reduction Program

On October 20, 2005, CARB approved a regulatory measure to reduce emissions of toxics and criteria pollutants by limiting idling of new and in-use sleeper berth equipped diesel trucks.[15] The regulation consists of new engine and in-use truck requirements and emission performance requirements for technologies used as alternatives to idling the truck's main engine. For example, the regulation requires 2008 and newer model year heavy-duty diesel engines to be equipped with a non-programmable engine shutdown system that automatically shuts down the engine after five minutes of idling, or optionally meet a stringent NO_X emission standard. The regulation also requires operators of both in-state and out-of-state registered sleeper berth equipped trucks to manually shut down their engine when idling more than five minutes at any location within California beginning in 2008. Emission producing alternative technologies such as diesel-fueled auxiliary power systems and fuel-fired heaters are also required to meet emission performance requirements that ensure emissions are not exceeding the emissions of a truck engine operating at idle.

In-Use Off-Road Diesel-Fueled Fleet Regulation

On July 26, 2007, CARB adopted a regulation to reduce DPM and NO_X emissions from in-use (existing), off-road, heavy-duty diesel vehicles in California.[16] Such vehicles are used in construction, mining, and industrial operations. The regulation is designed to reduce harmful emissions from vehicles by subjecting fleet owners to retrofit or accelerated replacement/repower requirements, imposing idling limitations on owners, operators, renters, or lessees of off-road diesel vehicles. The idling limits require operators of applicable off-road vehicles (self-propelled diesel-fueled vehicles 25 horsepower and up that were not designed to be driven on-road) to limit idling to less than five minutes. The idling requirements are specified in Title 13 of the California Code of Regulations.

State Regulations Related to Greenhouse Gases

The following regulations address GHG and climate change within California.

[15] California Air Resources Board. *Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling*. October 24, 2013. Available at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm. Accessed March 2017.

[16] California Air Resources Board. *In-Use Off-Road Diesel Vehicle Regulation.* December 10, 2014. Available at: http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm. Accessed March 2017.

AB 1493

California AB 1493 (Stats. 2002, ch. 200) (Health & Safety Code, §§42823, 43018.5), known as Pavley I, was enacted on July 22, 2002. AB 1493 requires that the CARB develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by the CARB to be vehicles whose primary use is noncommercial personal transportation in the state." On June 30, 2009, the USEPA granted a waiver of CAA preemption to California for the State's GHG emission standards for motor vehicles, beginning with the 2009 model year. Pursuant to the CAA, the waiver allows for the State to have special authority to enact stricter air pollution standards for motor vehicles than the federal government's. On September 24, 2009, the CARB adopted amendments to the Pavley regulations (Pavley I) that reduce GHG emissions in new passenger vehicles from 2009 through 2016. The second phase of the Pavley regulations (Pavley II) is expected to affect model year vehicles from 2016 through 2020. The CARB estimates that the regulation would reduce GHG emissions from the light-duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030.

Renewable Portfolio Standard (RPS)

Established in 2002 under SB 1078, accelerated in 2006 under SB 107, and expanded in 2011 under SB 2, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020.

Executive Order S-03-05

On June 1, 2005, then-Governor Schwarzenegger signed Executive Order S-03-05, which established total GHG emission targets. Specifically, emissions are to be reduced to year 2000 levels by 2010, 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (Cal-EPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary is also directed to submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts.

To comply with the Executive Order, the Secretary of the Cal-EPA created a Climate Act Team (CAT) made up of members from various State agencies and commissions. In March 2006, CAT released their first report. In addition, the CAT has released several "white papers" addressing issues pertaining to the potential impacts of climate change on California.

AB 32

In September 2006, AB 32, the California Climate Solutions Act of 2006, was enacted (Stats. 2006, ch. 488) (Health & Saf. Code, §38500 et seq.). AB 32 delegated the authority for its implementation to the CARB and directs CARB to enforce the State-wide cap. Among other

requirements, AB 32 required CARB to (1) identify the State-wide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020, and (2) develop and implement a Scoping Plan. Accordingly, the CARB has prepared the *Climate Change Scoping Plan* (Scoping Plan) for California, which was approved in 2008 and updated in 2014.[17] The 2008 Scoping Plan identified GHG reduction measures that would be necessary to reduce statewide emissions as required by AB 32. Many of the GHG reduction measures identified in the 2008 Scoping Plan have been adopted, such as the Low Carbon Fuel Standard, Pavley, Advanced Clean Car standards, Renewable Portfolio Standard (RPS), and the State's Cap-and-Trade system.

Building upon the 2008 Scoping plan, the 2013 Scoping Plan Update introduced new strategies and recommendations to continue GHG emissions reductions. The 2013 Scoping Plan Update created a framework for achievement of 2020 GHG reduction goals and identified actions that may be built upon to continue GHG reductions past 2020, as required by AB 32. A second update to the Scoping Plan has recently been prepared and was adopted by CARB on December 14, 2017.[18]

California GHG Cap-and-Trade Program

The AB 32 Scoping Plan identifies a cap-and-trade program as one of the strategies California will employ to reduce the GHG emissions that cause climate change.[19] The program will help put California on the path to meet the GHG emission reduction goal of 1990 levels by the year 2020, and ultimately achieving an 80 percent reduction from 1990 levels by 2050. Under cap-and-trade, an overall limit on GHG emissions from capped sectors would be established by the cap-and-trade program and facilities subject to the cap would be able to trade permits (allowances) to emit GHGs. The CARB has designed a California cap-and-trade program that is enforceable and meets the requirements of AB 32. The program started on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions. On January 1, 2014 California linked the state's cap-and-trade plan with Quebec's, and on January 1, 2015 the program expanded to include transportation and natural gas fuel suppliers.

Executive Order S-01-07

On January 18, 2007, then-Governor Schwarzenegger signed Executive Order S-01-07, which mandates that a State-wide goal be established to reduce carbon intensity of California's transportation fuels by at least 10 percent by 2020. The Order also requires that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California.

SB 97

As amended, SB 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under CEQA. The bill directed the Governor's Office of

[17] California Air Resources Board. *First Update to the Climate Change Scoping Plan*. May 22, 2014.
[18] California Air Resources Board. *California's 2017 Climate Change Scoping Plan*. November 2017.
[19] California Air Resources Board. *AB 32 Scoping Plan*. Available at: https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed February 2018.

Planning and Research (OPR) to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. As directed by SB 97, the OPR amended the CEQA Guidelines to provide guidance to public agencies regarding the analysis and mitigation of GHG emissions and the effects of GHG emissions in CEQA documents. The amendments included revisions to the *Appendix G Initial Study Checklist* that incorporated a new subdivision to address project-generated GHG emissions and contribution to climate change. The new subdivision emphasizes that the effects of GHG emissions are cumulative, and should be analyzed in the context of CEQA's requirements for cumulative impacts analysis. Under the revised CEQA Appendix G checklist, an agency should consider whether a project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and whether a project conflicts with an applicable plan, policy, or regulation adopted for the purpose of reducing emission of GHGs.

Further guidance based on SB 97 suggests that the lead agency make a good-faith effort, based on available information, to describe, calculate, or estimate the amount of GHG emissions resulting from a project. When assessing the significance of impacts from GHG emissions on the environment, lead agencies should consider the extent to which the project may increase or reduce GHG, as compared to the existing environmental setting, whether the project emissions exceed a threshold of significance determined applicable to the project, and/or the extent to which the project complies with adopted regulations or requirements to implement a state wide, regional, or local plan for the reduction or mitigation of GHG emissions. Feasible mitigation under SB 97 includes on-site and off-site measures, such as GHG emission-reducing design features and GHG sequestration.

SB 375

In September 2008, SB 375, known as the Sustainable Communities and Climate Protection Act of 2008, was enacted, which is intended to build on AB 32 by attempting to control GHG emissions by curbing sprawl. SB 375 enhances CARB's ability to reach goals set by AB 32 by directing CARB to develop regional GHG emission reduction targets to be achieved by the State's 18 metropolitan planning organizations (MPOs), including the Association of Bay Area Governments (ABAG). Under SB 375, MPOs must align regional transportation, housing, and land-use plans and prepare a "Sustainable Communities Strategy" (SCS) to reduce the amount of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its greenhouse gas reduction targets. SB 375 provides incentives for creating walkable and sustainable communities and revitalizing existing communities, and allows home builders to get relief from certain environmental reviews under CEQA if they build projects consistent with the new sustainable community strategies. Furthermore, SB 375 encourages the development of alternative transportation options, which will reduce traffic congestion.

Executive Order S-13-08

Then-Governor Arnold Schwarzenegger issued Executive Order S-13-08 on November 14, 2008. The Executive Order is intended to hasten California's response to the impacts of global climate change, particularly sea level rise, and directs state agencies to take specified actions to assess and plan for such impacts, including requesting the National Academy of Sciences to prepare a Sea

Level Rise Assessment Report, directing the Business, Transportation, and Housing Agency to assess the vulnerability of the State's transportation systems to sea level rise, and requiring the Office of Planning and Research and the Natural Resources Agency to provide land use planning guidance related to sea level rise and other climate change impacts.

The order also required State agencies to develop adaptation strategies to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. The adaption strategies report summarizes key climate change impacts to the State for the following areas: public health; ocean and coastal resources; water supply and flood protection; agriculture; forestry; biodiversity and habitat; and transportation and energy infrastructure. The report recommends strategies and specific responsibilities related to water supply, planning and land use, public health, fire protection, and energy conservation.

AB 197 and SB 32

On September 8, 2016, AB 197 and SB 32 were enacted with the goal of providing further control over GHG emissions in the State. SB 32 built on previous GHG reduction goals by requiring that the CARB ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by the year 2030. Achieving a 40 percent reduction of statewide GHG emissions by 2030 represents a critical milestone on the path to reducing statewide GHG Emissions by 80 percent by 2050, as required by Executive Order S-03-05. Additionally, SB 32 emphasizes the critical role that reducing GHG emissions would play in protecting disadvantaged communities and public health from adverse impacts of climate change. Enactment of SB 32 was predicated on the enactment of AB 197, which seeks to make the achievement of SB 32's mandated GHG emission reductions more transparent to the public and responsive to the Legislature. Transparency to the public is achieved by AB 197 through the publication of an online inventory of GHG and TAC emissions from facilities required to report such emissions pursuant to Section 38530 of California's Health and Safety Code. AB 197 further established a six-member Joint Legislative Committee on Climate Change Policies, which is intended to provide oversight and accountability of the CARB, while also adding two new legislatively-appointed, non-voting members to the CARB. Additionally, AB 197 directs the CARB to consider the "social costs" of emission reduction rules and regulations, with particular focus on how such measures may impact disadvantaged communities.

The CARB has recently prepared an update to the State's Climate Change Scoping Plan in accordance with the 2030 GHG emissions targets codified by SB 32, which was adopted by CARB on December 14, 2017..

California Building Standards Code

California's building codes (California Code of Regulations [CCR], Title 24) are published on a triennial basis, and contain standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Standards Commission (CBSC) is responsible for the administration and implementation of each code cycle, which includes the proposal, review, and adoption process. Supplements and errata are issued throughout

the cycle to make necessary mid-term corrections. The 2016 code became effective January 1, 2017. The California building code standards apply State-wide; however, a local jurisdiction may amend a building code standard if the jurisdiction makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

California Green Building Standards Code

The 2016 California Green Building Standards Code, otherwise known as the CALGreen Code (CCR Title 24, Part 11), is a portion of the CBSC, which became effective with the rest of the CBSC on January 1, 2017. The purpose of the CALGreen Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices. The provisions of the code apply to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure throughout California.

The CALGreen Code encourages local governments to adopt more stringent voluntary provisions, known as Tier 1 and Tier 2 provisions, to further reduce emissions, improve energy efficiency, and conserve natural resources. If a local government adopts one of the tiers, the provisions become mandates for all new construction within that jurisdiction. The City of Antioch has not adopted any voluntary provisions of the CALGreen Code to date.

Building Energy Efficiency Standards

The 2016 Building Energy Efficiency Standards is a portion of the CBSC, which expands upon energy efficiency measures from the 2013 Building Energy Efficiency Standards resulting in a 28 percent reduction in energy consumption from the 2013 standards for residential structures. Energy reductions relative to previous Building Energy Efficiency Standards would be achieved through various regulations including requirements for the use of high efficacy lighting, improved water heating system efficiency, and high performance attics and walls.

Local Regulations

The following are the regulatory agencies and regulations pertinent to the proposed project on a local level.

Plan Bay Area

Plan Bay Area is a long-range integrated transportation and land use/housing strategy through 2040 for the San Francisco Bay Area, designed to reduce GHG emissions from cars and light-duty trucks. On July 18, 2013, the Plan was jointly approved by the MTC and the ABAG. Pursuant to SB 375, the Plan includes the region's Sustainable Communities Strategy and 2040 Regional Transportation Plan. Plan Bay Area provides a strategy for meeting 80 percent of the region's

future housing needs in Priority Development Areas (PDAs).[20] Plan Bay Area anticipates that from 2010 to 2040, Contra Costa County is projected to experience 12 percent of the total regional housing growth, or an estimated 93,390 additional households. The County will also take 11 percent of the region's job growth, or 70,300 new jobs, the majority of which will be in PDAs. Both job and housing growth will cluster along San Pablo Avenue in the western part of the County, including Richmond, as well as in the suburbs of Antioch, Pittsburg, Walnut Creek, and San Ramon. A PDA is not identified in the vicinity of the proposed project.

The plan assists jurisdictions seeking to implement the plan at the local level by providing funding for PDA planning and transportation projects. Plan Bay Area also provides jurisdictions with the option of increasing the efficiency of the development process for projects consistent with the plan and other criteria included in SB 375.

Bay Area Air Quality Management District

The BAAQMD is the public agency entrusted with regulating stationary sources of air pollution in the nine counties that surround San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties. The BAAQMD has prepared their own *CEQA Air Quality Guidelines* (May 2017), which is intended to be used for assistance with CEQA review. The BAAQMD CEQA Air Quality Guidelines include thresholds of significance and project screening levels for criteria air pollutants (ROG, NO_X, PM_{10}, and $PM_{2.5}$), GHGs, TACs, CO, and odors, as well as methods to assess and mitigate project-level and plan-level impacts.

Regional Air Quality Plans

As discussed above, the 2001 Ozone Attainment Plan was prepared as a revision to the Bay Area part of the SIP to achieve the federal ozone standard. The plan was adopted on October 24, 2001, approved by the CARB on November 1, 2001, and was submitted to the USEPA on November 30, 2001 for review and approval as a revision to the SIP. In addition, in order to fulfill federal air quality planning requirements, the BAAQMD adopted a $PM_{2.5}$ emissions inventory for the year 2010, which was submitted to the USEPA on January 14, 2013 for inclusion in the SIP.

The most recent State ozone plan is the 2017 CAP, adopted on April 19, 2017. The 2017 CAP was developed as a multi-pollutant plan that provides an integrated control strategy to reduce ozone, PM, TACs, and GHGs. Although the CCAA does not require the region to submit a plan for achieving the State PM_{10} standard, the BAAQMD has prioritized measures to reduce PM in developing the control strategy for the 2017 CAP. It should be noted that on January 9, 2013, the USEPA issued a final rule to determine that the San Francisco Bay Area has attained the 24-hour $PM_{2.5}$ federal standard, which suspends federal SIP planning requirements for the Bay Area.

The aforementioned applicable air quality plans contain mobile source controls, stationary source controls, and TCMs to be implemented in the region to attain the State and federal standards within

[20] Association of Bay Area Governments and Metropolitan Transportation Commission. *Plan Bay Area 2040: Final Preferred Scenario*. Available at: http://www.planbayarea.org/2040-plan/final-preferred-scenario. Accessed March 2017.

the SFBAAB. The plans are based on population and employment projections provided by local governments, usually developed as part of the General Plan update process.

Rules and Regulations

All projects under the jurisdiction of the BAAQMD are required to comply with all applicable BAAQMD rules and regulations. Applicable BAAQMD's regulations and rules include, but are not limited to, the following:

- Regulation 2: Permits
  - Rule 5: New Source Review of Toxic Air Contaminates
- Regulation 6: Particulate Matter and Visible Emissions
  - Rule 2: Commercial Cooking Equipment
  - Rule 3: Wood-burning Devices
- Regulation 7: Odorous Substances
- Regulation 8: Organic Compounds
  - Rule 3: Architectural Coatings
- Regulation 11: Hazardous Pollutants
  - Rule 2: Asbestos Demolition, Renovation and Manufacturing

<u>City of Antioch General Plan</u>

The following are applicable General Plan goals and policies related to air quality and GHG from the City of Antioch General Plan, including policies from Section 4.4.6.7 specific to the Sand Creek Focus Area:

Policy 4.4.6.7.ee. The Sand Creek Focus Area is intended to be "transit-friendly," including appropriate provisions for public transit and nonmotorized forms of transportation.

Objective 10.6.1 Minimize air pollutant emissions within the Antioch Planning Area so as to assist in achieving state and federal air quality standards.

Construction Emissions

Policy 10.6.2.a Require development projects to minimize the generation of particulate emissions during construction through implementation of the dust abatement actions outlined in the CEQA Handbook of the Bay Area Air Quality Management District.

Mobile Emissions

Policy 10.6.2.b Require developers of large residential and non-residential projects to participate in programs and to take

measures to improve traffic flow and/or reduce vehicle trips resulting in decreased vehicular emissions. Examples of such efforts may include, but are not limited to the following:

- Development of mixed use projects, facilitating pedestrian and bicycle transportation and permitting consolidation of vehicular trips.
- Installation of transit improvements and amenities, including dedicated bus turnouts and sufficient rights-of-way for transit movement, bus shelters, and pedestrian easy access to transit.
- Provision of bicycle and pedestrian facilities, including bicycle lanes and pedestrian walkways connecting residential areas with neighborhood commercial centers, recreational facilities, schools, and other public areas.
- Contributions for off-site mitigation for transit use.
- Provision of charging stations for electric vehicles within large employment-generating and retail developments.

Stationary Source Emissions

Policy 10.6.2.f Provide physical separations between (1) proposed new industries having the potential for emitting toxic air contaminants and (2) existing and proposed sensitive receptors (e.g ., residential areas, schools, and hospitals).

Policy 10.6.2.g Require new wood burning stoves and fireplaces to comply with EPA and BAAQMD approved standards.

City of Antioch Climate Action Planning

In 2007, the City of Antioch joined the International Council for Local Environmental Initiatives (ICLEI). As a member of the ICLEI, the City drafted and adopted two Climate Action Plans, one for municipal operations and the other for community-wide operations. Both Climate Action Plans provided GHG emissions inventories, with the Municipal Climate Action Plan considering emissions related to the provision of water, wastewater, and solid waste services, as well as assessing emissions related to the City's vehicle fleet, street lights within the City, City facilities, and employee commutes. Concurrently, the Community Climate Action Plan (CCAP) inventoried emissions related to residential energy consumption, industrial energy use, commercial energy use, solid waste, transportation and other mobile sources, solid waste generation, water consumption, and wastewater production. In compliance with AB 32, emissions reduction targets were

established for both community and municipal emissions, and two different approaches were implemented to meet the identified targets. The Municipal Climate Action Plan established measures and policies related to each emission source category, which would reduce existing and future emission from the identified sources. Simultaneously, the CCAP included GHG reduction strategies related to land use and transportation, green building and energy, and education and behavior change.

Although the CCAP does not include quantitative thresholds to assess a project's compliance with the CCAP, projects that are in compliance with AB 32 would be considered compliant with the CCAP. For instance, project's showing emissions reductions as required by AB 32, or projects incorporating reduction strategies from the CCAP are understood to be in compliance with the CCAP's GHG emissions reductions goals.

4.3.4 IMPACTS AND MITIGATION MEASURES

The standards of significance and methodology used to analyze and determine the proposed project's potential project-specific and cumulative impacts are described below. The standards are based on policies of the City of Antioch and other responsible agencies. In addition, a discussion of the project's impacts, as well as mitigation measures where necessary, is also presented.

Standards of Significance

The air quality and GHG emissions analysis in this EIR uses the thresholds for criteria pollutants, localized CO, TAC emissions, and GHG emissions as discussed below.

Criteria Pollutant Emissions

The BAAQMD thresholds of significance for ozone precursor and PM emissions are presented in Table 4.3-6, and are expressed in pounds per day (lbs/day) for construction and operational average daily emissions and tons per year (tons/year) for maximum annual operational emissions. In addition to the thresholds of significance presented below for criteria air pollutants of particular concern for the Bay Area, BAAQMD has developed thresholds for GHG emissions, localized CO emissions, and TACs. Pursuant to CEQA Guidelines Section 15064.4(b)(2), the lead agency is charged with determining a threshold of significance that is applicable to the project. For the analysis within this EIR, the City has elected to use the BAAQMD's thresholds of significance.

Table 4.3-6
BAAQMD Thresholds of Significance

	Construction	Operational	
Pollutant	**Average Daily Emissions (lbs/day)**	**Average Daily Emissions (lbs/day)**	**Maximum Annual Emissions (tons/year)**
ROG	54	54	10
NO_X	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10

Source: BAAQMD, CEQA Guidelines, May 2017.

Localized CO Emissions

If a project would cause localized CO emissions to exceed the 1-hour and 8-hour CAAQS of 20.0 parts per million (ppm) and 9.0 ppm, respectively, BAAQMD would consider the project to result in a significant impact to air quality. In order to provide a conservative indication of whether a project would result in localized CO emissions that would exceed the applicable threshold of significance, the BAAQMD has established screening criteria for localized CO emissions. According to BAAQMD, a project would result in a less-than-significant impact related to localized CO emission concentrations if the following screening criteria are met:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, 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; and
- 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, underpass, etc.).

TAC Emissions

According to BAAQMD, a significant impact related to TACs would occur if a project would cause any of the following:

- An increase in cancer risk levels of more than 10 persons in one million;
- A non-cancer (chronic or acute) hazard index greater than 1.0; or
- An annual average $PM_{2.5}$ concentration of 0.3 micrograms per cubic meter ($\mu g/m^3$) or greater.

An impact associated with TACs would also occur if the aggregate total of all past, present, and foreseeable future sources within a 1,000-foot radius from the fence line of a source, or from the location of a receptor, plus the contribution from the project, would exceed the following:

- An increase in cancer risk levels (from all local sources) of more than 100 persons in one million;
- A chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- An annual average $PM_{2.5}$ concentration (from all local sources) of 0.8 $\mu g/m^3$ or greater.

GHG Emissions

The BAAQMD developed a threshold of significance for project-level GHG emissions in 2009. The District's approach to developing the threshold was to identify a threshold level of GHG emissions for which a project would not be expected to substantially conflict with existing California legislation. At the time that the thresholds were developed, the foremost legislation regarding GHG emissions was AB 32, which established an emissions reductions goal of reducing

statewide emissions to 1990 levels by 2020.[21] If a project would generate GHG emissions above the threshold level, the project would be considered to generate significant GHG emissions and conflict with AB 32. The GHG emissions thresholds of significance recommended by BAAQMD to determine compliance with AB 32 are as follows:

- 1,100 $MTCO_2e$/yr; or
- 4.6 $MTCO_2e$/SP/yr, where "SP" equates to service population, which is the total residents plus employees.

Because BAAQMD emissions thresholds include both a mass emissions threshold (i.e., 1,100 $MTCO_2e$/yr), and an emissions efficiency threshold (i.e., 4.6 $MTCO_2e$/SP/yr), a project may result in operational emissions in excess of 1,100 $MTCO_2e$/yr, but still avoid a significant impact by resulting in emissions below the 4.6 $MTCO_2e$/SP/yr efficiency threshold, or vice versa. It should be noted that the foregoing thresholds are intended for use in assessing operational GHG emissions only. However, construction of a proposed project would result in GHG emissions over a short-period of time. To capture the construction-related GHG emissions due to buildout of the proposed project, such emissions are amortized over the duration of the construction period and added to the operational GHG emissions. Given that construction-related GHG emissions would not occur concurrently with operational emissions and would cease upon completion of construction activities, combining the two emissions sources represents a conservative estimate of total project GHG emissions.

Since the adoption of BAAQMD's GHG thresholds of significance, the State legislature has passed AB 197 and SB 32, which builds off of AB 32 and establishes a statewide GHG reduction target of 40 percent below 1990 levels by 2030. Considering the legislative progress that has occurred regarding statewide reduction goals since the adoption of BAAQMD's standards, the emissions thresholds presented above would determine whether a proposed project would be in compliance with AB 32, but would not demonstrate whether a project would be in compliance with SB 32. In accordance with the changing legislative environment, the BAAQMD has begun the process of updating the District's CEQA Guidelines; however, updated thresholds of significance have not yet been adopted. In the absence of BAAQMD-adopted thresholds to assess a project's compliance with SB 32, the City has chosen to consider additional GHG emissions thresholds.

The BAAQMD has determined that projects with operational emissions equal to or less than 1,100 $MTCO_2e$/yr or 4.6 $MTCO_2e$/SP/yr would comply with the emission reductions target of 1990 levels by 2020 set forth by AB 32. SB 32 requires that by 2030 statewide emissions be reduced by 40 percent beyond the 2020 reduction target set by AB 32; therefore, in the absence of specific guidance from BAAQMD or the CARB, the City assumes that in order to meet the reduction targets of SB 32, a proposed project would be required to reduce emissions by an additional 40 percent beyond the emissions reductions currently required by BAAQMD for compliance with AB 32. Assuming a 40 percent reduction from current BAAQMD targets would be in compliance with SB 32, a proposed project would be in compliance with SB 32 if the project's emissions did not exceed the following thresholds:

[21] Bay Area Air Quality Management District. *California Environmental Quality Act Guidelines Update: Proposed Thresholds of Significance*. December 7, 2009.

- 660 $MTCO_2e$/yr; or
- 2.76 $MTCO_2e$/SP/yr.

By using the BAAQMD thresholds of significance for GHG and the updated SB 32 thresholds discussed above, the City would comply with Section 15064.4(b)(3) of the CEQA Guidelines, which suggests that lead agencies consider the extent that the project would comply with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction of GHG emissions.

Standards of Significance Used

Based on the recommendations of BAAQMD as presented above and consistent with Appendix G of the CEQA Guidelines, this chapter of the EIR considers a significant impact associated with air quality and/or GHG emissions to occur if the proposed project would result in any of the following:

- Generation of short-term construction-related or operational criteria air pollutant emissions in excess of 54 lbs/day for ROG, NO_X, and $PM_{2.5}$ and 82 lbs/day for PM_{10}, or
- Conflict with or obstruct implementation of the 2017 Clean Air CAP, and/or the 2001 Ozone Attainment Plan;
- Exposure of sensitive receptors or the general public to substantial levels of pollutant concentrations (i.e., localized CO emissions of 20.0 ppm for 1-hour averaging time or 9.0 ppm for 8-hour averaging time; increase in cancer risk levels of more than 10 in one million or a non-cancer hazard index greater than 1.0; incremental increase in cancer risk levels of more than 0.3 $\mu g/m^3$ annual average $PM_{2.5}$; cumulative increase in cancer risk of more than 100 in one million or cumulative non-cancer hazard index greater than 10.0; and cumulative incremental increase in cancer risk levels of more than 0.8 $\mu g/m^3$ annual average $PM_{2.5}$);
- Creation of objectionable odors affecting a substantial number of people;
- Generation of cumulative criteria air pollutant emissions in excess of 10 tons/year for ROG, NO_X, and $PM_{2.5}$ and 15 tons/year for PM_{10}; and/or
- Generation of a cumulatively considerable contribution to GHG emissions in excess of 1,100 $MTCO_2e$/yr or 4.6 $MTCO_2e$/SP/yr for compliance with AB 32 and 660 $MTCO_2e$/yr or 2.76 $MTCO_2e$/SP/yr for compliance with SB 32.

Method of Analysis

A comparison of the proposed project's emissions to the thresholds discussed above shall determine the significance of the proposed project's potential impacts to air quality and climate change. Emissions attributable to the proposed project which exceed the significance thresholds could have a significant effect on regional air quality and the attainment of the federal and State AAQS. Where potentially significant air quality impacts are identified, mitigation measures are described that would reduce or eliminate the impact.

Construction Emissions

The proposed project's short-term construction emissions were estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2 software - a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions from land use projects.[22] The model applies inherent default values for various land uses, including trip generation rates based on the ITE Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data was available, such data was input into the model.

As shown in Figure 3-10, of the Project Description chapter of this EIR, the proposed project would be constructed in three separate phases. Construction of the project phases would occur sequentially, without overlap between the phases. Phase I of the project would include development of 350 residential units, and 54,000 square feet of commercial space over a total area of approximately 135 acres. Phase II would include construction of 350 residential units over 125 acres, and Phase III would include construction of a maximum of 638 units over 150 acres. Because Phase III of the project would involve the greatest number of units and disturb the greatest number of acres, Phase III would be anticipated to result in the most intense construction related emissions. As such, if the emissions of Phase III would not exceed the BAAQMD's thresholds of significance, the preceding two phases, which would involve less intense construction activity would similarly be anticipated to result in emissions below the BAAQMD's thresholds.

The following assumptions were made for emissions modeling of the construction-related emissions from Phase III of the proposed project:

- Demolition would involve the removal of approximately 3,500 square feet of building space;
- Assumed a six-year construction period;
- Buildout of Phase III would include 685 single-family dwelling units;
- Off-site construction activity would occur during Phase III; and
- A total of 150 acres would be disturbed during the grading phase.

In addition to the above modeling assumptions, it should be noted that Phase III construction activity was assumed to commence in April of 2020. While, the actual construction of Phase III is anticipated to commence in 2026, assuming such construction activities would occur in 2020 produces a conservative emissions estimate.

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. Results of the modeling are expressed in lbs/day for criteria air pollutant emissions and $MTCO_2e$/yr for GHG emissions, which allows for comparison between the model results and the thresholds of significance. All CalEEMod modeling results are included in Appendix C to this EIR.

[22] ENVIRON International Corporation and the California Air Districts. *California Emissions Estimator Model User's Guide Version 2016.3.2*. October 2017.

Operational Emissions

The proposed project's operational emissions were estimated using CalEEMod. The proposed project includes two potential buildout scenarios: a Multi-Generational Plan and a Traditional Plan. The Multi-Generational Plan would include a range of housing, including active adult housing, while the Traditional Plan would include only all-ages housing, and would not include active adult housing. Separate emissions modeling was performed for each of the buildout scenarios, allowing emissions from either scenario to be analyzed independently. Both scenarios were assumed to be fully operational by 2033.

The modeling performed for the proposed project included compliance with BAAQMD rules and regulations (i.e., low-volatile organic compound [VOC] paints, low-VOC cleaning supplies, wood-burning devices), as well as with the California Building Energy Efficiency Standards Code. The proposed project's compliance with the California Building Energy Efficiency Standards would be verified as part of the City's building approval review process. Furthermore, the CO_2 intensity factor was adjusted within CalEEMod in order to reflect PG&E's anticipated progress towards the State RPS goal by 2030.[23] Project-specific vehicle trip data was provided by Fehr & Peers for each buildout scenario individually, and the trip rate data was applied to the project modeling. The proposed project includes land dedicated for the future development of a fire station within the project site. The future fire station was assumed to include a diesel-powered emergency generator. Information regarding the potential future generator was included in emissions modeling for both development scenarios.

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. Results of the modeling are expressed in lbs/day for project-level emissions, tons/yr for cumulative emissions, and $MTCO_2e$/yr for GHG emissions, which allows for comparison between the model results and the thresholds of significance. All CalEEMod modeling results are included in Appendix C to this EIR.

The BAAQMD's GHG emissions thresholds include a threshold based on annual GHG emissions per service population. The service population of a project represents the number of anticipated residents in addition to the number of employees that would work at the commercial portion of a mixed-use development. For the proposed project, both development scenarios include residential and commercial components. The commercial component of the proposed project would be constant between the two projects, with approximately 54,000 square feet (sf) of commercial development anticipated at buildout of either development scenario. The commercial area is anticipated to generate approximately 141 employees during operations (54,000 sf / 383 sf per employee = 141 employees).[24] As further discussed in Chapter 4.9 of this EIR, the City's Housing Element indicates that the average household size within the City is 3.15 persons per household.[25] The Multi-Generational Plan would include the development of approximately 1,307 units, which would be anticipated to house 4,117 residents (3.15 persons per household x 1,307 households =

[23] California Public Utilities Commission. *California Renewables Portfolio Standard (RPS)*. Available at: http://www.cpuc.ca.gov/renewables/. Accessed November 2017.

[24] U.S. Green Building Council. *Building Area Per Employee By Business Type*. Available at: https://www.usgbc.org/Docs/Archive/General/Docs4111.pdf. Accessed November 2017.

[25] City of Antioch. *Housing Element* [pg. 2-9]. Adopted April 14, 2015.

4,117 residents). Alternatively, the Traditional Plan would include approximately 1,137 residential units, which would be anticipated to house 3,582 residents (3.15 persons per household x 1,137 households = 3,582 residents). It should be noted that the Multi-Generational Plan would include age restricted housing, the Active Adult community would be anticipated to experience a lower persons-per-household rate; however, the City of Antioch does not maintain persons-per-household rates for age restricted housing. In the absence of an age restricted person per household rate for the City, the City's overall persons-per-household rate is used in this analysis.

Considering both the employment generated by the commercial land use and the residential components of each development scenario, the Multi-Generational Plan would have a service population of 4,258, while the Traditional Plan would include a service population of 3,723.

Project-Specific Impacts and Mitigation Measures

As discussed in Chapter 3, Project Description, of this EIR, two development scenarios for the proposed project are currently being considered: a Multi-Generational Plan and a Traditional Plan. The following discussion of impacts is based on implementation of either of the development scenarios. Where impacts would be similar under both of the development scenarios, the discussion of impacts presented below is applicable for both scenarios. However, where impacts would differ between the two development scenarios, the impacts are discussed separately for each scenario. It should be noted that while potential impacts related to both development scenarios are analyzed, ultimately, only one development scenario would be constructed.

4.3-1 Generation of short-term construction-related criteria air pollutant emissions. Based on the analysis below, the impact would be *less than significant*.

Multi-Generational Plan and Traditional Plan

Construction of either scenario is anticipated to occur in three phases with the first phase beginning in April 2020. The anticipated intensity of each phase (i.e., the number of dwelling units or amount of commercial space to be constructed) is known, and the timing of each phase has been estimated. Phase III is anticipated to include the greatest amount of ground disturbance, as well as the construction of the highest number of units. Therefore, Phase III is considered to represent the most intense phase of construction. Because Phase III is considered the most intense construction phase, the potential construction-related emissions from build out of the proposed project would be greatest during Phase III, as compared to Phases I and II. Consequently, construction emissions for Phase III were modeled to provide an estimation of the worst-case construction-related emissions.

During construction of the project, various types of equipment and vehicles would temporarily operate on the project site. Construction exhaust emissions would be generated from construction equipment, vegetation clearing and earth movement activities, construction workers' commute, and construction material hauling for the entire construction period. The aforementioned activities would involve the use of diesel- and gasoline-powered equipment that would generate emissions of criteria pollutants. Project construction activities also represent sources of fugitive dust, which includes PM_{10} and

$PM_{2.5}$ emissions. As construction of the proposed project would generate air pollutant emissions intermittently within the site, and in the vicinity of the site, until all construction has been completed, construction is a potential concern because the proposed project is in a nonattainment area for ozone and PM.

The proposed project's maximum construction-related emissions were estimated using CalEEMod and are presented in Table 4.3-7. Modeling assumptions are discussed in the Method of Analysis section above. It should be noted that construction of the proposed project is required to comply with all BAAQMD rules and regulations including Regulation 8, Rule 3 related to architectural coatings.

Table 4.3-7
Maximum Unmitigated Construction Emissions (lbs/day)

Pollutant	Phase III Emissions	Threshold of Significance	Exceeds Threshold?
ROG	14.31	54	**NO**
NO_x	50.25	54	**NO**
PM_{10} (exhaust)	2.20	82	**NO**
PM_{10} (fugitive)	18.21	None	**N/A**
$PM_{2.5}$ (exhaust)	2.02	54	**NO**
$PM_{2.5}$ (fugitive)	9.97	None	**N/A**

Source: CalEEMod, October 2017 (see Appendix C).

As presented in Table 4.3-7, the proposed project would result in construction-related emissions of ROG, NO_X, $PM_{10,}$ and $PM_{2.5}$ below the applicable thresholds of significance. Because the proposed project's estimated unmitigated emissions would be below the applicable BAAQMD thresholds of significance, and construction activities associated with development of the proposed project would not substantially contribute to the BAAQMD's nonattainment status for ozone or PM.

In addition, all projects under the jurisdiction of the BAAQMD are recommended to implement all of the Basic Construction Mitigation Measures provided in the BAAQMD CEQA Guidelines, which include the following:

a. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
b. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
c. 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.
d. All vehicle speeds on unpaved roads shall be limited to 15 mph.
e. 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.

f. 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.
g. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
h. 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.

Although BAAQMD recommends that all construction activity within the SFBAAB implement the above listed Basic Construction Mitigation Measures, the proposed project was modeled without the inclusion of such measures to provide a conservative, worst-case emissions scenario. If project construction included any of the Basic Construction Mitigation Measures, PM emissions would be further reduced from what is presented in Table 4.3-7 above. Regardless of the implementation of the Basic Construction Mitigation Measures, as shown in Table 4.3-7, the proposed project would result in PM emission below the applicable threshold of significance.

Considering the above, construction of the proposed project would not violate any AAQS or contribute substantially to an existing or projected air quality violation, and a ***less-than-significant*** impact would occur associated with construction.

Mitigation Measure(s)
None required.

4.3-2 Generation of long-term operational criteria air pollutant emissions and a conflict with or obstruction of implementation of regional air quality plans. Based on the analysis below, even with mitigation, the impact is *significant and unavoidable*.

Emissions of ROG, NO_X, CO, and PM_{10} would be generated from both mobile and stationary sources during operation of either development scenario. Day-to-day activities such as future resident and employee vehicle trips to and from the project site would make up the majority of the mobile emissions. Emissions would occur from area sources such as natural gas combustion from heating mechanisms, landscape maintenance equipment exhaust, and consumer products (e.g., deodorants, cleaning products, spray paint, etc.).

As stated above, the project is required to comply with all BAAQMD rules and regulations including Regulations 6, Rule 3, associated with wood-burning devices, which restricts wood-burning devices in new building construction, and Regulation 8, Rule 3 related to architectural coatings, which requires use of low volatile organic compound (VOC) paints.

Multi-Generational Plan

The proposed project's daily unmitigated operational emissions under the Multi-Generational development scenario have been estimated using CalEEMod and are presented in Table 4.3-8. It should be noted that the anticipated vehicle trips associated with operation of the Multi-Generational development scenario were applied to the modeling based on the Transportation Impact Assessment prepared for the proposed project by Fehr & Peers.

Table 4.3-8
Unmitigated Maximum Multi-Generational Plan Operational Emissions (lbs/day)

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Proposed Project	78.07	78.17	54.77	16.85
BAAQMD Thresholds	54	54	82	54
Exceed Thresholds?	**YES**	**YES**	**NO**	**NO**

Source: CalEEMod, November 2017 (see Appendix C).

As shown in the table, the Multi-Generational Plan would result in operational emissions of $PM_{10,}$ and $PM_{2.5}$ below the applicable thresholds of significance. However, emissions of ROG and NO_X would exceed the applicable thresholds of significance. Therefore, under the Multi-Generational Plan, the project could contribute to the region's nonattainment status of ozone and/or violate an air quality standard.

Traditional Plan

The proposed project's daily unmitigated operational emissions under the Traditional development scenario have been estimated using CalEEMod and are presented in Table 4.3-9. It should be noted that the anticipated vehicle trips associated with operation of the Traditional development scenario were applied to the modeling based on the Transportation Impact Assessment prepared for the proposed project by Fehr & Peers.

Table 4.3-9
Unmitigated Maximum Traditional Plan Operational Emissions (lbs/day)

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Proposed Project	70.64	80.12	60.39	18.11
BAAQMD Thresholds	54	54	82	54
Exceed Thresholds?	**YES**	**YES**	**NO**	**NO**

Source: CalEEMod, February 2018 (see Appendix C).

As shown in Table 4.3-9, the Traditional Plan would result in operational emissions of $PM_{10,}$ and $PM_{2.5}$ below the applicable thresholds of significance. However, emissions of ROG and NO_X would exceed the applicable thresholds of significance. Therefore, under the Traditional Plan, the project could contribute to the region's nonattainment status of ozone and/or violate an air quality standard.

Conclusion

As stated previously, the applicable regional air quality plans include the 2001 Ozone Attainment Plan and the 2017 CAP. The air quality plans contain mobile source controls, stationary source controls, and TCMs to be implemented within the region to attain the State and federal ozone standards within the SFBAAB. According to the BAAQMD CEQA Guidelines, if a project would not result in significant and unavoidable air quality impacts, after the application of all feasible mitigation, the project may be considered consistent with the air quality plans. Additionally, if approval of a project would not cause the disruption, delay, or otherwise hinder the implementation of any air quality plan control measure, the project may be considered consistent with the air quality plans. Because the both development scenarios being considered would be expected to generate long-term operational criteria air pollutant emission in excess of thresholds, the project would be considered to conflict with or obstruct implementation of regional air quality plans.

Based on the above, the proposed project would result in a ***significant*** impact associated with the generation of operational emissions of ROG and NO_X in excess of thresholds and a conflict with or obstruction of implementation of regional air quality plans.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the emission of ROG and NO_X, related to project operations. Table 4.3-10 presents the maximally mitigated project emissions following implementation of Mitigation Measures 4.3-2 and 4.3-6. Please refer to Impact 4.3-6 for a further discussion of project mitigation requirements. However, considering the plan-level nature of the proposed project, the efficacy of the following mitigation measures cannot be fully analyzed at the time of environmental analysis. Therefore, the following mitigation measure may be insufficient to reduce potential emissions to a less-than-significant level, and, consequently, the impact is assumed to remain *significant and unavoidable*.

Multi-Generational Plan and Traditional Plan

4.3-2 *In order to reduce criteria air pollutant emissions from the proposed project, all future Improvement Plans for the proposed project, including plans for either residential or commercial developments within the project site, shall show the following features:*

- *Build out of the project site shall include the provision of bus stops per consultation with Tri Delta Transit;*
- *All indoor faucets installed within the project site shall include low flow fixtures, per the CalGreen Tier 1 Standards; and*
- *All outdoor landscaping shall include water conserving measures, per the CalGreen Tier 1 Standards, as such standards relate to water use reductions in landscaping.*

Table 4.3-10 Mitigated Maximum Project Operational Emissions (lbs/day)				
	ROG	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
Traditional Plan				
Unmitigated Traditional Plan	70.64	80.12	60.39	18.11
Mitigated Traditional Plan	70.64	80.12	60.39	18.11
Difference	*-0.00*	*-0.00*	*-0.00*	*-0.00*
BAAQMD Thresholds	54	54	82	54
Mitigated Emissions Exceed Thresholds?	**YES**	**YES**	**NO**	**NO**
Multi-Generational Plan				
Unmitigated Multi-Gnerational Plan	78.07	78.17	54.77	16.85
Mitigated Multi-Generational Plan	77.36	74.38	43.75	13.87
Difference	*-0.71*	*-3.79*	*-11.02*	*-2.98*
BAAQMD Thresholds	54	54	82	54
Mitigated Emissions Exceed Thresholds?	**YES**	**YES**	**NO**	**NO**
Source: CalEEMod, November 2017 and February 2018 (see Appendix C).				

In addition, Improvement Plans for the proposed project shall identify all feasible mitigation measures developed in coordination with the BAAQMD and the City to reduce significant impacts to the extent feasible. Mitigation Measures may include, but would not be limited to, BAAQMD's recommended mitigation measures such as the following:

- *Use zero-VOC paints, finishes, and adhesives only;*
- *Orient buildings to maximize passive solar heating;*
- *Improve bike and pedestrian network (complete sidewalks, connection to adjacent areas, connection to bike network, etc.);*
- *Implement bicycle and pedestrian facilities such as bike lanes, routes, and paths, bike parking, sidewalks, and benches;*
- *Promote ridesharing, transit, bicycling, and walking for work trips;*
- *Extend transit service into project site;*
- *Participate in bike sharing programs;*
- *Implement programs that offer residents free or discounted transit passes to encourage transit use;*
- *Subsidize residential transit passes;*
- *Promote use of public electric vehicle charging infrastructure;*
- *Provide charging stations and preferential parking spots for electric vehicles;*
- *Provide traffic calming features;*
- *Minimize use of cul-de-sacs and incomplete roadway segments;*
- *Install energy star appliances;*
- *Install solar water heating;*

- *Provide community composting facilities or curb-side food waste services;*
- *Use water efficient landscapes and native/drought-tolerant vegetation; and*
- *Provide electrical outlets outside of homes to allow for use of electrically powered landscaping equipment.*

If off-site mitigation measures are proposed, the applicant must be able to show that the emission reductions from identified projects are real, permanent through the duration of the project, enforceable, and are equal to the pollutant type and amount of the project impact being offset. BAAQMD recommends that off-site mitigation projects occur within the nine-county Bay Area in order to reduce localized impacts and capture potential co-benefits. If BAAQMD has established an off-site mitigation program at the time a development application is submitted, as an off-site mitigation measure, the applicant may choose to enter into an agreement with BAAQMD and pay into the established off-site mitigation program fund, where BAAQMD would commit to reducing the type and amount of emissions identified in the agreement.

4.3-3 Exposure of sensitive receptors or the general public to substantial levels of pollutant concentrations. Based on the analysis below, the impact is *less than significant*.

Multi-Generational Plan and Traditional Plan

The major pollutant concentrations of concern are localized CO emissions and TAC emissions, which are addressed in further detail below. Although two development scenarios are currently being considered, the types of land uses included in both scenarios and the potential for exposure of sensitive receptors to substantial pollutant concentrations would be generally similar.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. Implementation of the proposed project would increase traffic volumes on streets near the project site; therefore, the project would be expected to increase local CO concentrations. High levels of localized CO concentrations are only expected where background levels are high, and traffic volumes and congestion levels are high. The statewide CO Protocol document identifies signalized intersections operating at Level of Service (LOS) E or F, or projects that would result in the worsening of signalized intersections to LOS E or F, as having the potential to result in localized CO concentrations in excess of the State or federal AAQS, as a result of large numbers of cars idling at stop lights.[26]

[26] California Department of Transportation. *Transportation Project-Level Carbon Monoxide Protocol.* Revised December, 1997.

In accordance with the State CO Protocol, the BAAQMD has established preliminary screening criteria for determining whether the effect that a project would have on any given intersection would cause a potential CO hotspot. If the following criteria are met by the proposed project at all affected intersections, the proposed project would not be expected to result in a CO hotspot:

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

The East County Action Plan includes several adopted traffic management plans and programs for selected arterials in East Contra Costa County. The potential traffic-related impacts from both development scenarios are discussed in comparison with such plans and other regulations in further detail in Chapter 4.12, Transportation and Circulation of this EIR. The Contra Costa Congestion Management Program (CCMP) outlines strategies for managing the performance of regional transportation within the County, including standards, performance measures, a capital program of projects, and a travel demand element. The Traffic Impact Analysis prepared for the proposed project used the growth estimates, travel demand model, and other information from the CCMP, and the analysis presented in Chapter 4.12, of this EIR, includes consideration of the project's compliance with the CCMP. In addition, the Contra Costa Transportation Authority (CCTA) and associated Regional Transportation Planning Committees have set various standards on specific roadways, called Multi-Modal Transportation Service Objectives (MTSO's), which are specific to each region and regulate the routes of regional significance. The Traffic Impact Analysis prepared for the proposed project evaluated the potential for either development scenario to conflict with multi-modal transportation within the project area, including routes of regional significance, and the use of alternative means of transportation. As discussed in detail in Chapter 4.12, Transportation and Circulation of this EIR, impacts related to MTSO's would be less than significant because neither development scenario would result in impacts to alternative modes of transportation or routes of regional significance. Therefore, both development scenarios would be considered to be consistent with the applicable congestion management programs or transportation plans.

Based on data provided in the Transportation Impact Assessment prepared for the proposed project, the maximum traffic volume anticipated at an affected intersection would not reach 44,000 vehicles per hour under either development scenario. In addition, the scenarios would not increase traffic volumes at any intersections where vertical and/or horizontal mixing is substantially limited. Therefore, neither development scenario would be expected

to result in substantial levels of localized CO at surrounding intersections or generate localized concentrations of CO that would exceed standards.

TAC Emissions

Another category of environmental concern is TACs. Typically, the sources of TACs of concern are any sources located within 1,000 feet of a sensitive receptor or proposed project site. The CARB has identified DPM from diesel-fueled engines as a TAC; thus, high volume freeways, stationary diesel engines, such as construction equipment, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. The proposed project site is not in the vicinity of any high-volume freeway or other facilities attracting heavy or constant diesel vehicle traffic, and stationary sources of emissions do not exist within 1,000 feet of the project site.

It should be noted that the Kaiser Permanente Antioch Medical Center, to the east of the project site, across Deer Valley Road, maintains generators to provide emergency back-up power. The emergency generators are assumed to be diesel powered; thus, operation of the generators would release DPM into the air. Although emergency generators exist at the Kaiser Permanente Antioch Medical Center, the generators are located within the northeastern portion of the larger facility, and are over 1,590 feet away from the project site. Additionally, the generators only operate in emergency situations or for limited, routine maintenance. Maintenance activity is regulated under BAAQMD permitting, and emissions from the generators are not considered a substantial source of TACs in the area. Considering the limited and intermittent nature of emissions from the generators, and the distance between the project site and the existing generators, the existing generators would not have the potential to expose future residents to substantial concentrations of DPM.

In addition to the existing off-site generator, both development scenarios include the dedication of land for future development and use as a fire station. Future development and operation of the fire station, under either scenario, would include operation of a diesel-powered emergency generator. The emergency generator would be used to provide back-up power to the fire station, and during routine testing operations. Thus, the generator would only operate intermittently, or in emergency situations. The fire station parcel is adjacent to Deer Valley Road, the proposed extension of Sand Creek Road, and open space areas. The closest sensitive receptors to the fire station parcel would be future project residents to the north of the fire station parcel, across Sand Creek Road, which is anticipated to be more than 200 feet away from the generator. Concurrently, the closest off-site existing receptors would be approximately the patients at the Kaiser Permanente Antioch Medical Center 1,000 feet away. Installation, maintenance, and operation of the generator would be regulated by BAAQMD through Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants. Rule 5 would require that the generator meets health risk limits and requirements for Toxics Best Available Control Technology. Considering the distance of the proposed fire station parcel to the nearest sensitive receptor, the limited use of the generator, and the existing BAAQMD regulations for such generators, the potential future fire station generator would not be anticipated to generate substantial

amounts of TACs that could affect existing sensitive receptors near the project site, or future residents of the project site.

Construction-related activities could result in the generation of TACs, specifically DPM, from on-road haul trucks and off-road equipment exhaust emissions. However, construction is temporary and occurs over a relatively short duration in comparison to the operational lifetime of the proposed project. Methodologies for conducting health risk assessments are associated with long-term exposure periods (e.g., over a 70-year lifetime). Buildout of the proposed project would occur in phases, where only portions of the site would be disturbed at a time, with operation of construction equipment regulated by federal, State, and local standards, including BAAQMD rules and regulations, and occurring intermittently throughout the course of a day. Under either development scenario, construction equipment staging areas would be located away from the nearest sensitive receptors, which would be the residences located along the northern border of the site. In addition, winds move from west to east in the region, which would help to move any potential pollutants away from the residences to the north. Considering the short amount of time and intermittent nature of construction equipment operating within an influential distance to the nearest sensitive receptors, the likelihood that any one sensitive receptor would be exposed to high concentrations of DPM for any extended period of time would be low. For the aforementioned reasons, construction of either development scenario would not be expected to expose sensitive receptors to substantial pollutant concentrations.

Conclusion

The proposed project would not be expected to result in localized CO concentrations that would exceed standards and would not expose sensitive receptors to such. In addition, future sensitive receptors on-site would not be exposed to substantial levels of pollutant concentrations associated with existing or future sources. Furthermore, construction or operation of the proposed project would not be expected to expose existing or future sensitive receptors to substantial emissions associated with stationary diesel engines or other major on-site stationary source of TACs. Therefore, the proposed project would result in a ***less-than-significant*** impact associated with exposure of sensitive receptors to substantial levels of pollutant concentrations.

Mitigation Measure(s)
None required.

4.3-4 Creation of objectionable odors affecting a substantial number of people. Based on the analysis below, the impact is *less than significant.*

Multi-Generational Plan and Traditional Plan

As discussed above, due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, quantitative methodologies to determine the presence of a significant odor impact do not exist. Typical odor-generating land uses include, but are not limited to, wastewater

treatment plants, landfills, and composting facilities. Neither of the development scenarios would introduce any such land uses and is not located in the vicinity of any existing or planned such land uses.

Diesel fumes from construction equipment are often found to be objectionable; however, construction is temporary and operation of equipment is regulated by federal, State, and local standards, including BAAQMD rules and regulations. Buildout of either development scenario would occur in phases, and, as a result, construction equipment would only be located on portions of the project site being constructed within each phase. Therefore, construction equipment would operate at varying distances from existing sensitive receptors, and potential odors from such equipment would not expose any single receptor to odors for a substantial period of time. Development of either scenario would be required to comply with all applicable BAAQMD rules and regulations, which would help to control construction-related odorous emissions. Therefore, construction of either development scenario would not be expected to create objectionable odors affecting a substantial number of people.

Residential land uses are not typically associated with the creation of substantial objectionable odors. Therefore, the majority of development within either development scenario would not be anticipated to have the potential to create objectionable odors that would affect nearby sensitive receptors such as the existing residences to the north or the nearby Kaiser Permanente Antioch Medical Center. However, the commercial portion of both scenarios may include restaurant or other food preparation activities, which could generate odors. Odors related to restaurant are generally due to food waste disposal and/or food preparation. Food waste from potential future restaurants would produce food waste, which could create objectionable odors if not properly contained and handled. Title 6, Chapter 3 of the City of Antioch's Municipal Code includes specific requirements for the containment, handling, and collection of waste, including food waste. Future plans for development of potential restaurant uses within the commercial component of either development scenario would be required to comply with the City's Municipal Code, which would ensure that food waste disposal would not result in the production of odors. In addition, commercial uses such as restaurants that use charbroiling grills may create odorous emissions from cooking food, particularly oily foods. Operations of such sources could result in exposure of on-site receptors (i.e., customers for a short period of time and employees for an extended period of time), as well as nearby receptors, such as future residents of the project site in proximity to the commercial portion of the project, to objectionable odors. The potential exists for odors to carry off-site as well. However, fast food restaurants with charbroiling systems typically have an exhaust hood that captures emissions from the cooking surface, as well as scrubbers for washing the cooking vapors and trapping some of the larger particles. In addition, the nearest existing sensitive receptor would be located over 550 feet to the east of the project site and would not be expected to be affected by objectionable odors associated with the proposed project at such a distance. Accordingly, the project would not be expected to create objectionable odors affecting a substantial number of people.

It should be noted that BAAQMD regulates objectionable odors through Regulation 7, Odorous Substances, which does not become applicable until the Air Pollution Control Officer (APCO) receives odor complaints from ten or more complainants within a 90-day period. Once effective, Regulation 7 places general limitation on odorous substances and specific emission limitations on certain odorous compounds, which remain effective until such time that citizen complaints have been received by the APCO for one year. The limits of Regulation 7 become applicable again when the APCO receives odor complaints from five or more complainants within a 90-day period. Thus, although not anticipated, if odor complaints are made after the proposed project is developed, the BAAQMD would ensure that such odors are addressed and any potential odor effects reduced to less than significant.

For the aforementioned reasons, construction and operation of either development scenario would not create objectionable odors, nor would the project site be affected by any existing sources of substantial objectionable odors, and a ***less-than-significant*** impact related to objectionable odors would result.

Mitigation Measure(s)
None required.

Cumulative Impacts and Mitigation Measures

A project's emissions may be individually limited, but cumulatively considerable when taken in combination with past, present, and future development projects. The geographic context for the proposed project cumulative air quality analysis includes the City of Antioch and surrounding areas within the SFBAAB that are designated nonattainment for ozone and PM.

Global climate change is, by nature, a cumulative impact. Emissions of GHG contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change (e.g., sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts). A single project could not generate enough GHG emissions to contribute noticeably to a change in the global average temperature. However, the combination of GHG emissions from a project in combination with other past, present, and future projects could contribute substantially to the world-wide phenomenon of global climate change and the associated environmental impacts. Although the geographical context for global climate change is the Earth, for analysis purposes under CEQA and due to the regulatory context pertaining to GHG emissions and global climate change applicable to the proposed project, the geographical context for global climate change in this EIR is limited to the State of California.

4.3-5 Generation of a cumulatively considerable contribution to criteria air pollutant emissions. Based on the analysis below, even with mitigation, the impact is *significant and unavoidable*.

The long-term emissions associated with operation of either of the proposed development scenarios in conjunction with other existing or planned development in the area would incrementally contribute to the region's air quality.

Multi-Generational Plan

The contribution to cumulative emissions of criteria air pollutants from the Multi-Generational Plan were calculated using CalEEMod and are presented in Table 4.3-11.

Table 4.3-11
Unmitigated Multi-Generational Plan Cumulative Emissions (tons/yr)

Pollutant	Project Emissions	Threshold of Significance	Exceeds Threshold?
ROG	13.33	10	**YES**
NO_X	11.00	10	**YES**
PM_{10}	9.32	15	**NO**
$PM_{2.5}$	2.68	10	**NO**

Source: CalEEMod, November 2017 (see Appendix C).

As shown in the table, the Multi-Generational Plan's cumulative emissions of ROG and NO_X would exceed the applicable cumulative thresholds of significance.

Traditional Plan

The contribution to cumulative emissions of criteria air pollutants from the Traditional Plan were calculated using CalEEMod and are presented in Table 4.3-12. As shown in Table 4.3-12, the Traditional Plan's cumulative emissions of ROG and NO_X would exceed the applicable cumulative thresholds of significance.

Table 4.3-12
Unmitigated Traditional Plan Cumulative Emissions (tons/yr)

Pollutant	Project Emissions	Threshold of Significance	Exceeds Threshold?
ROG	12.03	10	**YES**
NO_X	11.76	10	**YES**
PM_{10}	10.34	15	**NO**
$PM_{2.5}$	2.94	10	**NO**

Source: CalEEMod, February 2018 (see Appendix C).

Conclusion

It should be noted that both development scenarios have been evaluated at a program-level, as detailed project designs have not yet been prepared. Because the environmental analysis included in this EIR is intended to provide a 'worst case scenario' evaluation for the development of either scenario, actual project emissions could be less than what has been estimated. Nonetheless, because at maximum allowable buildout, both proposed development scenarios could generate operational emissions of ROG and NO_X in excess of thresholds, the project's incremental contribution to cumulative air quality impacts could be considered ***significant***.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above impact associated with the generation of ROG and NO_X emissions. However, feasible mitigation is not currently available to fully reduce potential impacts related to project build out. Therefore, the impact is assumed to remain *significant and unavoidable*.

Multi-Generational Plan and Traditional Plan

4.3-5 Implement Mitigation Measure 4.3-2.

4.3-6 Generation of a cumulatively considerable contribution to GHG emissions. Based on the analysis below, even with mitigation, the impact is *significant and unavoidable*.

As discussed in the Regulatory Context section of this Chapter, GHG emissions have been regulated by the State through various pieces of legislation, principally AB 32 and SB 32. Both BAAQMD and the City have adopted plans to achieve emissions reductions in compliance with AB 32. However, neither BAAQMD nor the City has adopted specific plans or thresholds to assess a project's compliance with SB 32. Consequently, GHG emissions from both development scenarios are considered against adopted standards and plans under AB 32, as well as the SB 32 thresholds being applied in the analysis for this EIR.

An individual project's GHG emissions are at a micro-scale level relative to global emissions and effects to global climate change; however, an individual project could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact. As such, impacts related to emissions of GHG are inherently considered cumulative impacts.

Implementation of either proposed development scenario would cumulatively contribute to increases of GHG emissions that are associated with global climate change. Estimated GHG emissions attributable to future development would be primarily associated with increases of CO_2 and, to a lesser extent, other GHG pollutants, such as CH_4 and N_2O. Sources of GHG emissions include area sources, mobile sources or vehicles, utilities (electricity and natural gas), water usage, wastewater generation, and the generation of solid waste.

Construction GHG emissions are a one-time release and are, therefore, not typically expected to generate a significant contribution to global climate change. Neither the City nor BAAQMD has an adopted threshold of significance for construction-related GHG emissions and does not require quantification. Nevertheless, potential emissions from construction of the most intense phase of the project have been modeled using CalEEMod. Emissions modeling for construction showed that the most intensive year of construction during the most intensive phase of construction for either of the proposed development scenarios would result in the emission of 775 $MTCO_2e$. To provide a conservative analysis of GHG emissions, the emissions from the most intensive year of construction have been added to the annual operational emissions of both development scenarios.

The operational GHG emission estimations for both development scenarios were conducted individually using CalEEMod. Modeling assumptions are discussed in the Method of Analysis section above. Based on the assumptions discussed above service population for the Multi-Generational Plan is assumed to be 4,258, while the service population for the Traditional Plan is assumed to be 3,723.

Multi-Generational Plan Compliance with AB 32

As shown in Table 4.3-13, the Multi-Generational Plan's total unmitigated annual GHG emissions in the first year of full project operation, 2033, including amortized construction-related emissions, were estimated to be approximately 13,174.03 $MTCO_2e$/yr, which results in emissions of 3.09 $MTCO_2e$/SP/yr. Thus, implementation of the Multi-Generational Plan would result in emissions below the BAAQMD's 4.6 $MTCO_2e$/SP/yr threshold of significance for GHG emissions, and the Multi-Generational Plan would be considered in compliance with AB 32. It should be noted that due to the inclusion of age-restricted housing, which would be anticipated to experience a lower persons-per-household rate than the average household size, the Multi-Generational Plan would likely result in a lower service population than that assumed in this analysis. Thus, the GHG emissions per service population could be greater than presented in Table 4.3-13. However, as stated above, the City of Antioch does not maintain persons-per-household rates for age-restricted housing. In the absence of such, the City's overall persons-per-household rate is used for this analysis.

Traditional Plan Compliance with AB 32

Table 4.3-14 shows that the Traditional Plan's total unmitigated annual GHG emissions in the first year of full project operation, 2033, including amortized construction-related emissions, were estimated to be approximately 13,440.98 $MTCO_2e$/yr, which results in emissions of 3.61 $MTCO_2e$/SP/yr. Thus, implementation of the Traditional Plan would result in emissions below the BAAQMD's 4.6 $MTCO_2e$/SP/yr threshold of significance for GHG emissions, and the Traditional Plan would be considered in compliance with AB 32.

Table 4.3-13
Unmitigated Year 2033 Multi-Generational Plan GHG Emissions vs. AB 32 Compliance

	Annual GHG Emissions
Construction-Related GHG Emissions	775 $MTCO_2e$/yr
Operational GHG Emissions:	12,399.03 $MTCO_2e$/yr
Area	127.84 $MTCO_2e$/yr
Energy	3,537.17 $MTCO_2e$/yr
Mobile	7,603.69 $MTCO_2e$/yr
Waste	901.86 $MTCO_2e$/yr
Water	225.44 $MTCO_2e$/yr
Stationary Source[1]	3.02 $MTCO_2e$/yr
Total Annual GHG Emissions	13,174.03 $MTCO_2e$/yr
Total Annual GHG Emissions Per Service Population[1]	**3.09 $MTCO_2e$/SP/yr**
BAAQMD AB 32 Threshold	4.6 $MTCO_2e$/SP/yr
Exceeds Threshold?	**NO**

[1.] Represents potential emergency generator at future fire station.
[2] Service population for Multi-Generational Plan calculated to be 4,258 based on employment and persons per household information

Source: CalEEMod, November 2017 (see Appendix C).

Table 4.3-14
Unmitigated Year 2033 Traditional Plan GHG Emissions vs. AB 32 Compliance

	Annual GHG Emissions
Construction-Related GHG Emissions	775 $MTCO_2e$/yr
Operational GHG Emissions:	12,596.27 $MTCO_2e$/yr
Area	111.21 $MTCO_2e$/yr
Energy	3,091.17 $MTCO_2e$/yr
Mobile	8,475.10 $MTCO_2e$/yr
Waste	718.96 $MTCO_2e$/yr
Water	196.81 $MTCO_2e$/yr
Stationary Source[1]	3.02 $MTCO_2e$/yr
Total Annual GHG Emissions	13,371.27 $MTCO_2e$/yr
Total Annual GHG Emissions Per Service Population[1]	**3.59 $MTCO_2e$/SP/yr**
BAAQMD AB 32 Threshold	4.6 $MTCO_2e$/SP/yr
Exceeds Threshold?	**NO**

[1.] Represents potential emergency generator at future fire station.
[2] Service population for Multi-Generational Plan calculated to be 3,723 based on employment and persons per household information

Source: CalEEMod, February 2018 (see Appendix C).

Multi-Generational Plan and Traditional Plan Compliance With the CCAP

The City's CCAP was established to ensure the City's compliance with the statewide GHG reduction goals required by AB 32. The CCAP included emissions reduction targets for the City, as well as reduction strategies, but did not specify project-level emissions thresholds. Although the City's CCAP did not establish project-level thresholds to assess a project's compliance with AB 32, the BAAQMD adopted thresholds are designed to assess a project's compliance with AB 32 and statewide reduction goals. Therefore, if GHG emissions relating to implementation of a project are below the BAAQMD's thresholds of significance, the project would be considered in compliance with AB 32 and the goals of the City's CCAP. As discussed above, both development scenarios have been estimated to result in GHG emissions in compliance with BAAQMD's AB 32 thresholds. As a result, the proposed project would be considered in compliance with the GHG emissions reductions required by the City's CCAP to meet the State's AB 32 GHG reduction requirements.

In addition to the estimated GHG emissions meeting BAAQMD thresholds for AB 32, the design of the project would include several reduction strategies from the City's CCAP. For instance, the proposed project would include residential and commercial developments, with generally higher density development along transit corridors. Such mixed-use and transit friendly development would be consistent with Land Use Strategy L1 of the City's CCAP. Buildout of either development scenario would include bicycle lanes, and pedestrian facilities that would encourage alternative modes of transportations, in compliance with Transportation Strategy T7. Furthermore, since the adoption of CCAP the CBSC has been updated twice, including updates to the CALGreen code and the California Building Energy Efficiency Standards. The updates to the CBSC require that new commercial and residential structures be built with energy and water efficiencies equal to or in excess of the efficiencies required by the CCAP's Green Building and Energy Strategies. Finally, the CBSC requires that certain new developments include electric vehicle charging infrastructure, which would promote electric vehicle use in compliance with Transportation Strategies T8 and T9.

Considering the project's compliance with BAAQMD thresholds as well as the project's compliance with various reduction strategies within the City's CCAP, the proposed project would be considered consistent with the City's CCAP.

Multi-Generational Plan Compliance with SB 32

As shown in Table 4.3-15, the total unmitigated annual GHG emissions from operation of the Multi-Generational Plan in the year 2033, including amortized construction-related emissions, were estimated to be approximately 13,174.03 $MTCO_2e$/yr, which results in emissions of 3.09 $MTCO_2e$/SP/yr. Thus, implementation of the Multi-Generational Plan would result in emissions above the 660 $MTCO_2e$/yr and 2.76 $MTCO_2e$/SP/yr thresholds of significance being used for GHG emissions in the year 2030, and, thus, the Multi-Generational Plan would be considered to conflict with SB 32. Again, it should be noted that the Multi-Generational Plan would likely result in a lower service population than that

assumed in this analysis. Thus, the GHG emissions per service population could be greater than presented in Table 4.3-15. Nonetheless, the Multi-Generational Plan would still be considered to conflict with SB 32.

Table 4.3-15
Unmitigated Year 2033 Multi-Generational Plan GHG Emissions vs. SB 32 Compliance

	Annual GHG Emissions
Total Annual GHG Emissions[1]	13,174.03 $MTCO_2e$/yr
Total Annual GHG Emissions Per Service Population	**3.09 $MTCO_2e$/SP/yr**
SB 32 Threshold	2.76 $MTCO_2e$/SP/yr
Exceeds Threshold?	**YES**

[1] See Table 4.3-13 for a breakdown of Total Annual GHG emissions

Source: CalEEMod, November 2017 (see Appendix C).

Traditional Plan Compliance with SB 32

As shown in Table 4.3-16, the total unmitigated annual GHG emissions from operation of the Traditional Plan in the year 2033, including amortized construction-related emissions, were estimated to be approximately 13,440.98 $MTCO_2e$/yr, which results in emissions of 3.61 $MTCO_2e$/SP/yr. Thus, implementation of the Multi-Generational Plan would result in emissions above the 660 $MTCO_2e$/yr and 2.76 $MTCO_2e$/SP/yr thresholds of significance being used for GHG emissions in the year 2033, and, thus, the Traditional Plan would be considered to conflict with SB 32.

Table 4.3-16
Unmitigated Year 2033 Traditional Plan GHG Emissions vs. SB 32 Compliance

	Annual GHG Emissions
Total Annual GHG Emissions[1]	13,371.27 $MTCO_2e$/yr
Total Annual GHG Emissions Per Service Population	**3.59 $MTCO_2e$/SP/yr**
SB 32 Threshold	2.76 $MTCO_2e$/SP/yr
Exceeds Threshold?	**YES**

[1] See Table 4.3-14 for a breakdown of Total Annual GHG emissions

Source: CalEEMod, February 2018 (see Appendix C).

Conclusion

Based on the above, both development scenarios would be considered to be compliant with the emissions reduction targets of AB 32 and the City's CCAP. However, operational emissions in the year 2033 from either development scenario would not be anticipated to achieve the 40 percent emissions reduction from 1990 levels required by SB 32. Therefore, the proposed project would be considered to conflict with the goals of SB 32 and contribute to a ***cumulatively considerable*** impact related to GHG emissions.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the generation of GHG emissions during project operations as shown in Table 4.3-17. However, considering the plan-level nature of the proposed project, the efficacy of the following mitigation measure cannot be fully determined. Therefore, a guarantee cannot be made that GHG emissions from future development in the project area would not exceed the thresholds of significance used in this analysis, and the impact is assumed to remain *cumulatively considerable* and *significant and unavoidable.*

Table 4.3-17
Year 2033 GHG Emissions

Multi-Generational Plan	
Unmitigated Annual GHG Emissions	12,399.03 $MTCO_2e$/yr
Mitigated Annual GHG Emissions	10,818.69 $MTCO_2e$/yr
Difference	*-1,580.34*
Traditional Plan	
Unmitigated Annual GHG Emissions	12,596.27 $MTCO_2e$/yr
Mitigated Annual GHG Emissions	12,561.43 $MTCO_2e$/yr
Difference	*-34.84*

Source: CalEEMod, November 2017 and February 2018 (see Appendix C).

Multi-Generational Plan and Traditional Plan

4.3-6 *In addition to the mitigation measures discussed in Mitigation Measure 4.3-2, the proposed project shall be required to implement further measures to reduce GHG emissions to the maximum extent feasible. Such further measures may include, but are not limited to, the following:*

- *Use cool roof materials;*
- *Plant shade trees;*
- *Install smart meters and programmable thermostats;*
- *Install charging stations and preferential parking spots for electric vehicles;*
- *Install energy star appliances;*
- *Install solar water heating;*
- *Exceed minimum CALGreen standards (e.g., adopt Tier 1 or Tier 2 voluntary measures); and/or*
- *Pre-wire homes for photovoltaic systems.*

It should be noted that many of the mitigation measures indicated in Mitigation Measure 4.3-2 would act to reduce GHG emissions as well as emissions related to criteria pollutants.