4.3 Air Quality

This section describes the existing air quality conditions of the project site and vicinity, identifies associated regulatory requirements, evaluates potential project and cumulative impacts, and identifies mitigation measures for any significant impacts related to implementation of the Laguna Creek Diversion Retrofit Project (Proposed Project). The analysis is based on air quality modeling conducted for the Proposed Project, as part of the preparation of this environmental impact report (EIR). The results of the air modeling are summarized in this section, and are included in Appendix B.

A summary of the comments received during the scoping period for this EIR is provided in Table 2-1 in Chapter 2, Introduction, and a complete list of comments is provided in Appendix A. There were no comments related to air quality.

4.3.1 Existing Conditions

4.3.1.1 Meteorological and Topographical Conditions

The project site is in the North Central Coast Air Basin (Air Basin), which encompasses an area of 5,159 square miles and consists of Monterey, Santa Cruz, and San Benito counties. The northwest sector of the Air Basin is dominated by the Santa Cruz Mountains. The Diablo Range marks the northeastern boundary and, together with the southern extent of the Santa Cruz Mountains, forms the Santa Clara Valley, which extends into the northeastern tip of the Air Basin. Farther south, the Santa Clara Valley merges into the San Benito Valley, which extends northwest–southeast and has the Gabilan Range as its western boundary. To the west of the Gabilan Range is the Salinas Valley, which extends from Salinas at the northwest end to King City at the southeast end. The western side of the Salinas Valley is formed by the Sierra de Salinas, which also forms the eastern side of the smaller Carmel Valley. The coastal Santa Lucia Range defines the western side of the valley (MBARD 2008). This series of mountain ranges and valleys influences the dispersion of criteria air pollutants through the Air Basin.

The semi-permanent Pacific High pressure cell in the eastern Pacific Ocean is the basic controlling factor in the climate of the Air Basin. In the summer, the Pacific High pressure cell is dominant and causes persistent west and northwest winds over the entire California coast. Air descends in the Pacific High pressure cell forming a stable temperature inversion of hot air over a cool coastal layer of air. As the air currents move onshore, they pass over cool ocean waters and bring fog and relatively cool air into the coastal valleys. The warmer air above acts as a lid to inhibit vertical air movement.

During the summer, the generally northwest–southeast orientation of mountainous ridges tends to restrict and channel the onshore air currents. Elevated ground-surface temperatures in the interior portion of the Salinas and San Benito valleys create a weak low pressure area that intensifies the onshore air flow during the afternoon and evening. In the fall, the surface winds become weak, and the marine layer grows shallow, dissipating altogether on some days. The air flow is occasionally reversed in a weak offshore movement, and the relatively stationary air mass is held in place by the Pacific High pressure cell, which allows pollutants to build up over a period of a few days. It is most often during this season that the north or east winds develop to transport pollutants from either the San Francisco Bay Area or the Central Valley into the Air Basin. During the winter, the Pacific High migrates southward and has less influence on the Air Basin. Air frequently flows in a southeasterly direction out of the Salinas and San Benito valleys, especially during night and morning hours. Northwest winds are nevertheless still dominant in winter, but easterly flow is more frequent. The general absence of deep, persistent inversions and the occasional storm systems usually results in good air quality for the Air Basin in winter and early spring (MBARD 2008).

4.3.1.2 Pollutants and Effects

Criteria Air Pollutants

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

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

O_3 in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) to O_3 can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes (EPA 2013). These health problems are particularly acute in sensitive receptors such as the sick, the elderly, and young children.

Inhalation of O_3 causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms. Exposure to O_3 can reduce the volume of air that the lungs breathe in and cause shortness of breath. O_3 in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. The occurrence and severity of health effects from O_3 exposure vary widely among individuals, even when the dose and the duration of exposure are the same. Research shows adults and children who spend more time outdoors participating in vigorous physical activities are at greater risk from the harmful health effects of O_3 exposure. While there are relatively few studies of O_3's effects on children, the available studies show that children are no more or less likely to suffer harmful effects than adults. However, there are a number of reasons

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1 The descriptions of the criteria air pollutants and associated health effects are based on the EPA's Criteria Air Pollutants (EPA 2018a) and the CARB's Glossary of Air Pollutant Terms (CARB 2019a).

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

why children may be more susceptible to O_3 and other pollutants. Children and teens spend nearly twice as much time outdoors and engaged in vigorous activities as adults. Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults. Also, children are less likely than adults to notice their own symptoms and avoid harmful exposures. Further research may be able to better distinguish between health effects in children and adults. Children, adolescents and adults who exercise or work outdoors, where O_3 concentrations are the highest, are at the greatest risk of harm from this pollutant (CARB 2019b).

Nitrogen Dioxide and Oxides of Nitrogen. NO_2 is a brownish, highly reactive gas that is present in all urban atmospheres. The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide, which is a colorless, odorless gas. NO_x, which includes NO_2 and nitric oxide, plays a major role, together with ROG, in the atmospheric reactions that produce O_3. NO_x is formed from fuel combustion under high temperature or pressure. In addition, NO_x is an important precursor to acid rain and may affect both terrestrial and aquatic ecosystems. The two major emissions sources of NO_x are transportation and stationary fuel combustion sources (such as electric utility and industrial boilers).

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

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

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

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

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

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

Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Coarse particulate matter (PM_{10}) is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Fine particulate matter ($PM_{2.5}$) is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., from motor vehicles and power generation and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides, NO_x, and ROG.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the blood stream, causing damage elsewhere in the body. Additionally, these substances can transport adsorbed gases such as chlorides or ammonium into the lungs, also causing injury. PM_{10} tends to collect in the upper portion of the respiratory system, whereas $PM_{2.5}$ is small enough to penetrate deeper into the lungs and damage lung tissue. Suspended particulates also produce haze and reduce regional visibility and damage and discolor surfaces on which they settle.

A number of adverse health effects have been associated with exposure to both $PM_{2.5}$ and PM_{10}. For $PM_{2.5}$, short-term exposures (up to 24-hour duration) have been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. These adverse health effects have been reported primarily in infants, children, and older adults with preexisting heart or lung diseases. In addition, of all of the common air pollutants, $PM_{2.5}$ is associated with the greatest proportion of adverse health effects related to air pollution, both in the United States and worldwide based on the World Health Organization's Global Burden of Disease Project. Short-term exposures to PM_{10} have been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits (CARB 2017).

Long-term exposure (months to years) to $PM_{2.5}$ has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children. The effects of long-term exposure to PM_{10} are less clear, although several studies suggest a link between long-term PM_{10} exposure and respiratory mortality. The International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer (CARB 2017).

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

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

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

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

Non-Criteria Air Pollutants

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

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

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

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

4.3.1.3 Sensitive Receptors

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

As described in Chapter 3, Project Description, the project site is surrounded predominantly by undeveloped, heavily forested land, with scattered, low-density residential development to the east, south, and west. The nearest sensitive receptor to the project site is a residence approximately 100 feet to the south of the site, across Smith Grade.

4.3.2 Regulatory Framework

4.3.2.1 Federal

Criteria Air Pollutants

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

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

Hazardous Air Pollutants

The 1977 federal Clean Air Act amendments required the EPA to identify National Emission Standards for Hazardous Air Pollutants (HAPs) to protect public health and welfare. HAPs include certain VOCs, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 federal Clean Air Act Amendments, which expanded the control program for HAPs, 189 substances and chemical families were identified as HAPs.

4.3.2.2 State

Criteria Air Pollutants

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

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

California air districts have based their thresholds of significance for CEQA purposes on the levels that scientific and factual data demonstrate that the air basin can accommodate without affecting the attainment date that attainment will be achieved in the Air Basin for the NAAQS or CAAQS. Thresholds established by air districts are protective of human health, as they are based on attainment of the ambient air quality standards, which reflect the maximum pollutant levels in the outdoor air that would not result in harm to the public's health. Table 4.3-1 presents the NAAQS and CAAQS.

Table 4.3-1. Ambient Air Quality Standards

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

Source: CARB 2016.
Notes: ppm = parts per million by volume; µg/m³ = micrograms per cubic meter; mg/m³= milligrams per cubic meter.

Table 4.3-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentrations[c]	*Primary[c,d]*	*Secondary[c,e]*

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

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

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

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

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

[f] On October 1, 2015, the primary and secondary NAAQS for O_3 were lowered from 0.075 ppm to 0.070 ppm.

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

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

[i] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 μg/m³ to 12.0 μg/m³. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 μg/m³, as was the annual secondary standard of 15 μg/m³. The existing 24-hour PM_{10} standards (primary and secondary) of 150 μg/m³ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

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

[k] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 μg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated non-attainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

Toxic Air Contaminants

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

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines (CARB 2000). The regulation is anticipated to result in an 80% decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment Program. These regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. There are several airborne toxic control measures that reduce diesel emissions, including In-Use Off-Road Diesel-Fueled Fleets (13 CCR Section 2449 et seq.), In-Use On-Road Diesel-Fueled Vehicles (13 CCR Section 2025), and Limit Diesel-Fueled Commercial Motor Vehicle Idling (13 CCR Section 2485).

California Health and Safety Code Section 41700

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

4.3.2.3 Regional

Monterey Bay Air Resources District

The Monterey Bay Air Resources District (MBARD) is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the Air Basin, where the Proposed Project is located. The MBARD operates monitoring stations in the Air Basin, develops rules and regulations for stationary sources and equipment, prepares emissions inventory and air quality management planning documents, and conducts source testing and inspections. The MBARD's Air Quality Management Plans (AQMPs) include control measures and strategies to be implemented to attain CAAQS and NAAQS in the Air Basin. The MBARD then implements these control measures as regulations to control or reduce criteria pollutant emissions from stationary sources or equipment.

Air Quality Management Plan. The 1991 AQMP for the Air Basin was the first plan prepared in response to the California Clean Air Act of 1988, which established specific planning requirements to meet the O_3 standard. The California Clean Air Act requires that the AQMP be updated every 3 years. The most recent update is the *2012–2015 Air Quality Management Plan* (2012–2015 AQMP), which was adopted in March 2017, and is an update to the elements included in the 2012 AQMP. The primary elements updated from the 2012 AQMP are the air quality trends analysis, emission inventory, and mobile source programs.

The Air Basin is a non-attainment area for the CAAQS for both O_3 and PM_{10}. The AQMP addresses only attainment of the O_3 CAAQS. Attainment of the PM_{10} CAAQS is addressed in the MBARD's *2005 Report on Attainment of the California Particulate Matter Standards in the Monterey Bay Region* (Particulate Matter Plan), which was adopted in December 2005 and is summarized further below. Maintenance of the 8-hour NAAQS for O_3 is addressed in MBARD's *2007 Federal Maintenance Plan for Maintaining the National Ozone Standard in the Monterey Bay Region* (Federal Maintenance Plan), which was adopted in March 2007 and is also summarized below.

A review of the air monitoring data for 2013 through 2015, from the most recent AQMP, indicates that there were fewer exceedance days compared to previous periods (MBARD 2017). The long-term trend shows that progress has been made toward achieving O_3 standards. The number of exceedance days has continued to decline during the past 10 years despite population increases. The MBARD's 2012 to 2015 AQMP identifies a continued trend of declining O_3 emissions in the Air Basin primarily related to lower vehicle miles traveled (VMT). Therefore, the MBARD determined progress was continuing to be made toward attaining the 8-hour O_3 standard during the 3-year period reviewed (MBARD 2017).

Federal Maintenance Plan. The Federal Maintenance Plan (May 2007) presents the strategy for maintaining the NAAQS for O_3 in the Air Basin. It is an update to an earlier maintenance plan (1994) that was prepared for maintaining the 1-hour NAAQS for O_3 and has since been revoked and superseded by the current 8-hour O_3 standard. Effective June 15, 2004, the EPA designated the Air Basin as an attainment area for the 8-hour NAAQS for O_3. The plan includes an emission inventory for the years 1990 to 2030 for ROG and NO_x, the two primary O_3 precursor gases. A contingency plan is included to ensure that any future violation of the standard is promptly corrected (MBARD 2007).

Particulate Matter Plan. The purpose of the Particulate Matter Plan (December 2005) is to fulfill the requirements of Senate Bill 655, which was approved by the Legislature in 2003 with the objective of reducing public exposure to particulate matter. The legislation requires CARB, in conjunction with local air pollution control districts, to adopt a list of the most readily available, feasible, and cost-effective control measures that could be implemented by air pollution control districts to reduce ambient levels of particulate matter in their air basins (MBARD 2005). The Particulate Matter Plan's proposed activities include control measures for fugitive dust, public education, administrative functions, and continued enhancements to the MBARD's smoke management and emission-reduction incentive programs.

Rules and Regulations. The MBARD establishes and administers a program of rules and regulations to attain and maintain state and national air quality standards and regulations related to TACs. Rules and regulations that may apply to the Project during construction and/or operations include the following:

- Regulation IV (Prohibitions), Rule 400 (Visible Emissions). This rule provides limits for visible emissions for sources within the MBARD jurisdiction.
- Regulation IV (Prohibitions), Rule 402 (Nuisances). This rule establishes a prohibition against sources creating public nuisances while operating within the MBARD jurisdiction.
- Regulation IV (Prohibitions), Rule 403 (Particulate Matter). This rule provides particulate matter emissions limits for sources operating within the MBARD jurisdiction.
- Regulation IV (Prohibitions), Rule 424 (National Emission Standards for Hazardous Air Pollutions). This rule is to provide clarity on the MBARD's enforcement authority for the National Emission Standards for Hazardous Air Pollution including asbestos from demolition.
- Regulation IV (Prohibitions), Rule 425 (Use of Cutback Asphalt). This rule establishes VOC emissions limits associated with the use of cutback and emulsified asphalts.
- Regulation IV (Prohibitions), Rule 426 (Architectural Coatings). This rule establishes VOC emissions limits associated with the use of architectural coatings.

4.3.2.4 Air Quality

North Central Coast Air Basin Attainment Designations

Pursuant to the 1990 federal Clean Air Act amendments, the EPA classifies air basins (or portions thereof) as "attainment" or "non-attainment" for each criteria air pollutant, based on whether the NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as attainment for that pollutant. If an area exceeds the standard, the area is classified as non-attainment for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to meet the standard despite a lack of monitoring data. Areas that achieve the standards after a non-attainment designation are redesignated as maintenance areas and must have approved maintenance plans to ensure continued attainment of the standards. Similar to the federal Clean Air Act, the California Clean Air Act, designated areas as attainment or non-attainment, but based on CAAQS rather than the NAAQS. Table 4.3-2 identifies the current attainment status of the Air Basin, including the project site, with respect to the NAAQS and CAAQS, and the attainment classifications for the criteria pollutants; the Air Basin is designated as a non-attainment area for the state O_3 and PM_{10} standards. The Air Basin is designated as unclassified or attainment for all other state and federal standards (EPA 2018b; CARB 2018b). Since the Air Basin has met all federal AAQS, it is no longer subject to federal conformity requirements (MBARD 2008).

Table 4.3-2. North Central Coast Air Basin Attainment Classification

Pollutant	Averaging Time	Designation/Classification
National Standards		
O_3	8 hours	Unclassifiable/Attainment
NO_2	1 hour, annual arithmetic mean	Unclassifiable/Attainment
CO	1 hour; 8 hours	Unclassifiable/Attainment
SO_2	24 hours; annual arithmetic mean	Unclassifiable/Attainment
PM_{10}	24 hours	Unclassifiable/Attainment
$PM_{2.5}$	24 hours; annual arithmetic mean	Unclassifiable/Attainment
Lead	Quarter; 3-month average	Unclassifiable/Attainment
California Standards		
O_3	1 hour; 8 hours	**Non-attainment**
NO_2	1 hour; annual arithmetic mean	Attainment
CO	1 hour; 8 hours	Attainment
SO_2	1 hour; 24 hours	Attainment
PM_{10}	24 hours; annual arithmetic mean	**Non-attainment**
$PM_{2.5}$	Annual arithmetic mean	Attainment
Lead	30-day average	Attainment
SO_4	24 hours	Attainment
H_2S	1 hour	Unclassified
Vinyl chloride	24 hours	No designation
Visibility-reducing particles	8 hours (10:00 a.m.–6:00 p.m.)	Unclassified

Sources: EPA 2018b (national); CARB 2018b (California).
Notes: O_3 = ozone; NO_2 = nitrogen dioxide; CO = carbon monoxide; SO_2 = sulfur dioxide; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_4 = sulfates; H_2S = hydrogen sulfide.

Local Ambient Air Quality

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across California. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. Table 4.3-3 presents the most recent background ambient air quality data from 2016 to 2018, collected at the following stations:

- The Santa Cruz monitoring station located at 2544 Soquel Avenue in Santa Cruz is the nearest air quality monitoring station to the project site, located approximately 10 miles south of the project site. This station monitors O_3, and NO_2.
- The nearest station that monitors CO and $PM_{2.5}$ is at 855 E. Laurel Drive in Salinas, approximately 36 miles southeast of the project site.
- The nearest station that monitors PM_{10} is at 1979 Fairview Road in Hollister, approximately 41 miles southeast of the project site.

The data collected at these stations is considered generally representative of the air quality experienced in the vicinity of the project site as these stations are the closest available monitoring stations to the project site. This data is shown in Table 4.3-3 and includes the number of days that the ambient air quality standards were exceeded.

Table 4.3-3. Local Ambient Air Quality Data

Averaging Time	Ambient Air Quality Standard	Measured Concentration and Exceedances by Year		
		2016	*2017*	*2018*
Ozone (O_3) – Santa Cruz Monitoring Station				
Maximum 1-hour concentration (ppm)	0.09 ppm (state)	0.064	0.082	0.075
Number of days exceeding state standard (days)		0	0	0
Maximum 8-hour concentration (ppm)	0.070 ppm (state)	0.057	0.075	0.061
	0.070 ppm (federal)	0.057	0.075	0.061
Number of days exceeding state standard (days)		0	1	0
Number of days exceeding federal standard (days)		0	1	0
Nitrogen Dioxide (NO_2) – Santa Cruz Monitoring Station				
Maximum 1-hour concentration (ppm)	0.18 ppm (state)	0.033	0.034	0.047
	0.100 ppm (federal)	0.033	0.034	0.047
Number of days exceeding state standard (days)		*0*	*0*	*0*
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Annual concentration (ppm)	0.030 ppm (state)	0.005	0.004	0.005
	0.053 ppm (federal)	0.005	0.004	0.005
Carbon Monoxide (CO) – Salinas Monitoring Station				
Maximum 1-hour concentration (ppm)	20 ppm (state)	4.2	2.7	3,5
	35 ppm (federal)	4.2	2.7	3.5
Number of days exceeding state standard (days)		0	0	0
Number of days exceeding federal standard (days)		0	0	0
Maximum 8-hour concentration (ppm)	9.0 ppm (state)	0.9	0.9	1.2
	9 ppm (federal)	0.9	0.9	1.2
Number of days exceeding state standard (days)		0	0	0
Number of days exceeding federal standard (days)		0	0	0

Table 4.3-3. Local Ambient Air Quality Data

Averaging Time	Ambient Air Quality Standard	Measured Concentration and Exceedances by Year		
		2016	*2017*	*2018*
Fine Particulate Matter ($PM_{2.5}$) – Salinas Monitoring Station				
Maximum 24-hour concentration (µg/m^3)	35 µg/m^3 (federal)	28.7	42.2	64.0
Number of days exceeding federal standard[a]		*0.0 (0)*	*1.0 (1)*	*3.0 (1)*
Annual concentration (µg/m^3)	12 µg/m^3 (state)	5.3	5.5	*6.1*
	12.0 µg/m^3 (federal)	5.2	5.6	*6.1*
Coarse Particulate Matter (PM_{10}) – Hollister Monitoring Station				
Maximum 24-hour concentration (µg/m^3)	50 µg/m^3 (state)	ND	ND	*ND*
	150 µg/m^3 (federal)	44.3	80.9	*78.0*
Number of days exceeding state standard[a]		*ND*	*ND*	*ND*
Number of days exceeding federal standard[a]		*0.0 (0)*	*0.0 (0)*	*0.0 (0)*
Annual concentration (state method) (µg/m^3)	20 µg/m^3 (state)	ND	ND	ND

Sources: CARB 2018a; EPA 2018c.

Notes: ppm = parts per million; µg/m^3 = micrograms per cubic meter; ND = insufficient data available to determine the value.

Data taken from CARB iADAM (http://www.arb.ca.gov/adam) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.

Exceedances of national and California standards are only shown for O_3 and particulate matter. Daily exceedances for particulate matter are estimated days because PM_{10} and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed national or California standards during the years shown. There is no national standard for 1-hour ozone, annual PM_{10}, or 24-hour SO_2, nor is there a state 24-hour standard for $PM_{2.5}$.

Santa Cruz Monitoring Station is located at 2544 Soquel Avenue, Santa Cruz, 95060

Salinas Monitoring Station is located at 855 E Laurel Drive, Salinas, 93901.

Hollister Monitoring Station is located at 1979 Fairview Road, Hollister, 95023.

a Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

4.3.3 Impacts and Mitigation Measures

This section contains the evaluation of potential environmental impacts associated with the Proposed Project related to air quality. The section identifies the standards of significance used in evaluating the impacts, describes the methods used in conducting the analysis, and evaluates the Proposed Project's impacts and contribution to significant cumulative impacts, if any are identified.

4.3.3.1 Thresholds of Significance

The standards of significance used to evaluate the impacts of the Proposed Project related to air quality are based on Appendix G of the CEQA Guidelines, as listed below. A significant impact would occur if the Proposed Project would:

A. Conflict with or obstruct implementation of the applicable air quality plan.

B. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

C. Expose sensitive receptors to substantial pollutant concentrations.

D. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The MBARD has established thresholds of significance for criteria air pollutants of concern for construction and operations (MBARD 2008). For construction, the threshold is 82 pounds per day of PM_{10}. For operations, a project would result in a significant impact if it results in the generation of emissions of, or in excess of, 137 pounds per day for ROG or NO_x, 550 pounds per day of CO, 150 pounds per day of sulfur oxides (SO_x), and 82 pounds per day of PM_{10} from on-site sources. As stated above, the Air Basin met all federal AAQS. As a result, it is no longer subject to federal conformity requirements (MBARD 2008).

Consistency with the AQMP is used by MBARD to determine a project's cumulative impact on regional air quality (i.e., ozone levels). Projects which are not consistent with the AQMP have not been accommodated in the AQMP and will have a significant cumulative impact on regional air quality unless emissions are totally offset (MBARD 2008). For localized impacts of the Proposed Project (i.e., PM_{10}), the threshold for cumulative impacts is the same as that noted above (82 pounds per day of PM_{10}). The localized impacts related to CO hotspots and MBARD's associated thresholds are not applicable, as the Proposed Project would not generate a net increase in operational traffic.

Health effects from carcinogenic air toxics are usually described in terms of cancer risk. The MBARD recommends an incremental cancer risk threshold of 10 in 1 million. "Incremental cancer risk" is the net increased likelihood that a person continuously exposed to concentrations of TACs resulting from a project over a 9-, 30-, and 70-year exposure period will contract cancer based on the use of standard Office of Environmental Health Hazard Assessment risk-assessment methodology. In addition, some TACs have noncarcinogenic effects. The MBARD recommends a Hazard Index of 1 or more for acute (short-term) and chronic (long-term) effects.[3]

4.3.3.2 Analytical Methods

Construction Emissions

Proposed construction activities would result in the temporary emissions of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment and soil disturbance) and off-site sources (i.e., on-road haul trucks, delivery trucks, and worker vehicle trips). The California Emissions Estimator Model (CalEEMod) Version 2016.3.2 was used to estimate emissions from construction of the project (CAPCOA 2017). CalEEMod is a statewide computer model developed in cooperation with air districts throughout the state to quantify criteria air pollutant and GHG emissions associated with construction activities and operation of a variety of land use projects, such as residential, commercial, and industrial facilities. CalEEMod input parameters, including the land use type used to represent the project and its size, construction schedule, and anticipated use of construction equipment, were based on information provided for the Proposed Project or default model assumptions if project specifics were unavailable. Construction emissions can vary substantially from day-to-day, depending on the level of activity; the

3 Non-cancer adverse health risks are measured against a hazard index, which is defined as the ratio of the predicted incremental exposure concentrations of the various noncarcinogens from the Project to published reference exposure levels that can cause adverse health effects.

specific type of operation; and, specifically for dust, the prevailing weather conditions. Therefore, emission levels presented in the analysis below are approximate with a corresponding uncertainty in precise ambient air quality impacts.[4] The construction phasing schedule and duration, vehicle trip assumptions, and construction equipment mix used for estimating the project-generated daily emissions are shown in Table 4.3-4.

Table 4.3-4. Construction Assumptions Used In Project-Generated Daily Emissions

Construction Phase	One-Way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Trips*	*Total Haul Trucks*	*Type*	*Quantity*	*Hours*
Access Road Improvements, Site Preparation, and Mobilization						
Site Preparation	10	0	4	Excavators	1	8
				Tractors/Loaders/Backhoes	1	8
Access Road Grading	2	0	14	Graders	1	8
Cofferdam and Temporary Stream Bypass System						
Cofferdams Installation	10	0	0	Tractors/Loaders/Backhoes	1	8
Pipe Installation	10	0	0	Excavators	1	8
				Pumps	1	8
				Tractors/Loaders/Backhoes	1	8
Installation of Control Systems	2	0	0	Generator Sets	4	8
				Pumps	2	8
				Tractors/Loaders/Backhoes	1	8
				Welders	1	8
New Coanda Screen Intake and Valve Vault Structures						
Excavation	2	0	8	Excavators	1	8
				Tractors/Loaders/Backhoes	1	8
Doweling	2	0	6	Bore/Drill Rigs	1	8
Concrete Pour	10	0	20	Cement and Mortar Mixers	1	8
				Excavators	1	8
				Pumps	1	8
New Intake Structure, Coanda Screen	2	0	2	Cement and Mortar Mixers	1	8
				Excavators	1	8
				Tractors/Loaders/Backhoes	1	8
Diversion Pipeline	8	0	0	Concrete/Industrial Saws	1	8
				Excavators	1	8
				Forklifts	1	8
				Pumps	1	8
				Tractors/Loaders/Backhoes	1	8

4 The analysis assumes a construction start date in 2021. Assuming the earliest start date for construction represents the worst-case scenario for criteria air pollutant and greenhouse gas emissions, because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years.

Table 4.3-4. Construction Assumptions Used In Project-Generated Daily Emissions

Construction Phase	One-Way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Trips*	*Total Haul Trucks*	*Type*	*Quantity*	*Hours*
Modifications to Existing Intake and Sediment Control Values						
Pipe Installation	4	0	0	Concrete/Industrial Saws	1	8
				Excavators	1	8
				Tractors/Loaders/Backhoes	1	8
Backfill Structures	6	0	12	Cement and Mortar Mixers	1	8
				Concrete/Industrial Saws	1	8
Electrical Installations						
Electrical Conduit	2	2	0	Concrete/Industrial Saws	1	8
				Excavators	1	8
				Forklifts	1	8
				Pumps	1	8
				Tractors/Loaders/Backhoes	1	8
Access Stairs and Riprap Bank Stabilization						
Access Stairs	8	2	4	Cement and Mortar Mixers	1	8
Riprap Installation	8	2	6	Tractors/Loaders/Backhoes	1	8
Startup and Testing, Site Restoration, and Construction Closeout						
Start up and Testing	6	0	0	Generator Sets	1	8
				Tractors/Loaders/Backhoes	2	8

Source: B&V and SCWD 2020; see Appendix B.

Internal combustion engines used by construction equipment, trucks, and worker vehicles would result in emissions of VOCs, NO_x, CO, PM_{10}, and $PM_{2.5}$. Emissions of PM_{10} and $PM_{2.5}$ would also be generated by entrained dust, which results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil. As described in Section 3.6.3, Standard Construction Practices, dust control measures including watering of active construction areas would be implemented (Standard Construction Practice #4). These measures are accounted for in the construction analysis for the Proposed Project.

Operational Emissions

As described in Chapter 3, Project Description, the Proposed Project's operation and maintenance be improved but activities would generally remain similar to existing activities and would have a similar frequency and intensity. However, unlike existing conditions, the Proposed Project would not require periodic sediment removal from behind the dam.

Similar to existing conditions, operation and maintenance would include weekly station checks; monthly cleaning, inspections of equipment, testing of the generator, and landscape maintenance; annual inspections of equipment and service of the generator; and road maintenance every 5 years. Overall, the demand for electricity and water, generation of solid waste and wastewater, and vehicle trips to the site for maintenance would not substantially increase over existing conditions. Because the Proposed Project would not result in substantial changes to energy use, vehicle trips, or equipment use during operations and maintenance activities at the site, there would be no air quality impacts associated with operations and maintenance of the Proposed Project.

4.3.3.3 Project Impact Analysis

This section provides a detailed evaluation of air quality impacts associated with the Proposed Project.

Impact AIR-1: Conflict with an Applicable Air Quality Plan (Significance Standard A). The Proposed Project would not conflict with or obstruct the MBARD's AQMP. ***(Less than Significant)***

As described in the MBARD CEQA Guidelines (2008), Proposed Project emissions that are not accounted for in the AQMP's emission inventory are considered a significant cumulative impact to regional air quality. However, construction exhaust emissions from planned and projected projects have already been accounted for in the AQMP emissions inventory (MBARD 2018), and therefore the Proposed Project construction emissions, which are accounted for in the inventory, would not result in a significant impact. Furthermore, as determined in Impact AIR-2 (discussed below), construction emissions from the Proposed Project would not exceed the MBARD thresholds of significance.

During operations, long-term emissions would be similar to the existing conditions at the project site, and therefore the Proposed Project would not result in operational impacts.

Therefore, the construction and operation of the Proposed Project would not conflict with or obstruct implementation of the AQMP, and this impact would be less than significant.

Impact AIR-2: Criteria Pollutant Emissions (Significance Standard B). The Proposed Project would result in emissions of criteria pollutants, but would not exceed adopted thresholds of significance, violate any air quality standards or contribute substantially to an existing or projected air quality violation. Therefore, the Proposed Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. ***(Less than Significant)***

Construction Emissions

Construction of the Proposed Project is anticipated to occur over approximately 3 months, targeted to occur between June and October, and would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and ROG off-gassing) and off-site sources (i.e., on-road haul trucks and worker vehicle trips). Construction emissions would vary substantially from day-to-day, depending on the level of activity, the specific type of operation, and specifically for dust, the prevailing weather condition. Detailed assumptions used to estimate criteria air pollutant emissions are discussed above.

Specific construction emissions anticipated from the Proposed Project are described below. Fugitive dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, as well as re-entrainment from on-road vehicles, resulting in PM_{10} and $PM_{2.5}$ emissions. Internal combustion engines used by construction equipment, haul trucks, and worker vehicles would result in emissions of ROG, NO_x, CO, PM_{10}, and $PM_{2.5}$. Based on MBARD CEQA Guidelines (2008), ROG and NO_x exhaust emissions from typical construction activities generally would not result in a significant impact because their emissions are already accounted for in the emissions inventories of the state- and federally-required air plans, and they would not have a significant impact on the attainment and maintenance of the O_3 AAQS. Table 4.3-5 presents the estimated maximum daily construction emissions. The approach to the emission calculations is discussed in Section 4.3.2.2, Analytical Methods, above, and additional details are provided in Appendix B.

Table 4.3-5. Estimated Maximum Daily Construction Criteria Air Pollutant Emissions

Construction Year	ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
	Pounds per Day					
Year 2021	6.70	57.44	73.85	0.12	2.67	3.22
Maximum daily emissions	6.70	57.44	73.85	0.12	2.67	3.22
MBARD threshold	N/A	N/A	N/A	N/A	82	N/A
Threshold exceeded?	N/A	N/A	N/A	N/A	No	N/A

Source: Appendix B.
Notes: ROG = reactive organic gases; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; MBARD = Monterey Bay Air Resources District; N/A = Not applicable.

As shown in Table 4.3-5, maximum daily emissions of PM_{10} associated with Proposed Project construction would not exceed the applicable MBARD significance threshold. Therefore, the Proposed Project's construction emissions would be less than significant.

Operational Emissions

As explained above, the operation of the Proposed Project would not result in changes in operational activities; no additional routine daily equipment operation or additional vehicle trips would be required. Because the Proposed Project would not result in changes to long-term operational activities, there would be no air quality impacts associated with operational air pollutant emissions.

Given the conclusions above, the Proposed Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. See Impact AIR-5 for additional information about cumulative air quality impacts.

Impact AIR-3: **Exposure of Sensitive Receptors (Significance Standard C).** The Proposed Project would not expose sensitive receptors to substantial pollutant concentrations. ***(Less than Significant)***

This impact evaluates the health effects of criteria air pollutants and toxic air contaminants that would be emitted by the Proposed Project.

Health Effects of Criteria Air Pollutants

Reactive Organic Gases, Oxides of Nitrogen, and Ozone. The health effects associated with O_3 are generally associated with reduced lung function and the Air Basin is designated as non-attainment for the O_3 CAAQS. Both ROG and NO_x are precursors to O_3. The contribution of ROG and NO_x to regional ambient O_3 concentrations is the result of complex photochemistry. The increases in O_3 concentrations in the Air Basin due to O_3 precursor emissions tend to be found downwind from the source location due to the time required for the photochemical reactions to occur. In addition, the potential for exacerbating O_3 concentrations depends on the time of year that the ROG emissions occur; exceedances of the O_3 AAQS tend to occur between April and October when solar radiation is highest.

Overall, the analysis of a single project's emissions of O_3 precursors is speculative due to the lack of quantitative methods available to assess this impact. However, ROG and NO_x exhaust emissions for typical construction activities are already accounted for in the emissions inventories of the state- and federally-required air plans. Therefore, the Proposed Project's emissions would not have a significant impact on the attainment and maintenance of the O_3 AAQS or result in potential health effects associated with O_3.

Nitrogen Dioxide and Oxides of Nitrogen. Health effects that result from NO_2 and NO_x include respiratory irritation, which could be experienced by nearby receptors during the periods of heaviest use of off-road construction equipment. However, existing NO_2 concentrations in the area are well below the NAAQS and CAAQS standards. Construction and operation of the Proposed Project would not create substantial, localized NO_x impacts nor would it contribute to exceedances of the NAAQS and CAAQS for NO_2. Therefore, the Proposed Project is not anticipated to result in potential health effects associated with NO_2 and NO_x.

Carbon Monoxide. Mobile source impacts related to CO occur both regionally and locally. Regionally, project-related construction travel would add to regional trip generation and increase the VMT within the local airshed and the Air Basin. Locally, project-generated traffic would be added to the roadway system near the project site during construction. If such traffic occurs during periods of poor atmospheric ventilation, is composed of a large number of vehicles "cold-started" and operating at pollution-inefficient speeds, and is operating on roadways already crowded with non-project traffic, there is a potential for the formation of microscale CO hotspots in the area immediately around points of substantially elevated and localized CO emissions, such as around congested intersections.

During construction, the Proposed Project would result in CO emissions from construction worker vehicles, haul trucks, and off-road equipment. Title 40, Section 93.123(c)(5) of the California Code of Regulations, Procedures for Determining Localized CO, PM_{10}, and $PM_{2.5}$ Concentrations (hot-spot analysis), states that "CO, PM_{10}, and $PM_{2.5}$ hot-spot analyses are not required to consider construction-related activities, which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last 5 years or less at any individual site" (40 CCR Section 93.123). Since construction activities would be temporary, a project-level construction hotspot analysis is not required. Furthermore, the Proposed Project would not result in additional traffic trips during operation above those already occurring under existing conditions and therefore would not exceed the MBARD CO screening criteria resulting in the formation of potential CO hotspots. Therefore, the Proposed Project's CO emissions would not contribute to significant health effects associated with this pollutant.

Particulate Matter. As depicted in Table 4.3-5 above, construction of the Proposed Project would result in minimal emissions of PM_{10} and $PM_{2.5}$ and would not contribute to exceedances of the NAAQS and CAAQS for particulate matter or obstruct the Air Basin's attainment status of these pollutants. Since PM_{10} is representative of the levels of DPM, the Proposed Project would also not result in substantial DPM emissions during construction and operation, and therefore, would not result in significant health effects related to DPM exposure. Due to the minimal emissions of PM_{10} and $PM_{2.5}$ during construction, it is not anticipated that the Proposed Project would result in potential health effects related to particulate matter.

In summary, because construction and operation emissions of criteria air pollutants from the Proposed Project would not exceed the applicable MBARD significance thresholds, and because the MBARD thresholds are based on levels that the Air Basin can accommodate without affecting the attainment date for the AAQS and the AAQS are established to protect public health and welfare, it is anticipated that the Proposed Project would not result in health effects associated with criteria air pollutants. Therefore, the Proposed Project would have less-than-significant impacts related to health effects of criteria air pollutants.

Toxic Air Contaminants

There are several rural residential land uses located in proximity to the project site, with the nearest approximately 100 feet south of the project site. DPM emissions would be emitted from heavy equipment operations, and heavy-duty trucks. As discussed above, heavy-duty construction equipment and commercial trucks are subject to CARB Air Toxic Control Measures to reduce diesel particulate emissions. As described in Table 4.3-5 above, maximum daily total particulate matter (PM_{10}) emissions generated by construction equipment operation and haul trucks trips (exhaust particulate matter, or DPM, combined with fugitive dust generated by equipment operation and vehicle travel), would be well below the MBARD significance threshold. Moreover, the duration of construction would be short term, lasting approximately 3 months. No residual TAC emissions or corresponding cancer risk are anticipated after construction, and no long-term sources of TAC emissions are anticipated during operation of the Proposed Project. Due to the relatively short period of exposure at any individual sensitive receptor, including the nearest receptor 100 feet from the southern site boundary, and the minimal particulate emissions generated, TACs emitted during construction would not result in concentrations causing significant health risks. Therefore, the Proposed Project would have less-than-significant impacts related to TACs.

Impact AIR-4: Result In Other Emissions Adversely Affecting a Substantial Number of People (Significance Standard D). The Proposed Project would not result in other emissions, such as those leading to odors, that would adversely affect a substantial number of people. ***(Less than Significant)***

The occurrence and severity of potential odor impacts depends on numerous factors, including the nature, frequency, and intensity of the source; the wind speeds and direction; and the sensitivity of the receptor. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public and generate citizen complaints. Typical sources of odors can include exhaust emissions during construction, or operational uses such as landfills, rendering plants, chemical plants, agricultural uses, wastewater treatment plants, and refineries.

During construction of the Proposed Project, odors would be potentially generated from vehicles and equipment exhaust emissions from concentrations of unburned hydrocarbons in the tailpipes of construction equipment, architectural coatings, or asphalt pavement. Such odors would disperse rapidly from the project site and given the rural nature of the surrounding area and projected distance from sensitive receptors, odors from construction would not affect a substantial number of people. Therefore, impacts associated with odors during construction would be less than significant.

During operations, the Proposed Project would entail the continued uses on the project site, specifically water diversion through the operation of the Facility infrastructure and associated activities. Any odors produced would be minimal and would be similar to existing conditions. Overall, the Proposed Project would not result in odors that would affect a substantial number of people and this impact would be less than significant.

4.3.3.4 Cumulative Impacts Analysis

This section provides an evaluation of cumulative air quality impacts associated with the Proposed Project and other reasonably foreseeable future projects, as identified in Table 4.1-1 in Section 4.1, Introduction to Analysis, and as relevant to this topic. The geographic area considered for cumulative air quality impacts is the Air Basin.

Impact AIR-5: Cumulative Air Quality Impacts (Significance Standards A, B, C and D). The Proposed Project, in combination with past, present, and reasonably foreseeable future development, would not result in a significant cumulative impact related to air quality. ***(Less than Significant)***

By its nature, air pollution is largely a cumulative impact. The non-attainment status of regional pollutants is a result of past and present development, and the MBARD has developed and implemented plans for maintaining attainment of AAQS and bringing the region into attainment for those pollutants for which it is currently in non-attainment (i.e. the state O_3 and PM_{10} standards). Therefore, as indicated in Section 4.3.3.1, Thresholds of Significance, consistency with the AQMP is used by MBARD to determine a project's cumulative impact on regional air quality (i.e., ozone levels) (MBARD 2008). As indicated in Impact AIR-1, the Proposed Project would not conflict with the AQMP and therefore would not have a significant cumulative impact related to ozone. Likewise, as indicated in Impact AIR-2, construction emissions from the Proposed Project would not exceed MBARD thresholds of significance. Additionally, the construction periods of the other known cumulative construction projects planned within the Laguna Watershed, including the Laguna Pipeline portion of the North Coast System Repair and Replacement Project and the Reggiardo Diversion upgrade identified in the Anadromous Fisheries Habitat Conservation Plan would not overlap with construction of the Proposed Project; therefore, the Proposed Project would not have a significant cumulative impact related to localized impacts (PM_{10}). Furthermore, the Proposed Project would not exceed the MBARD significance thresholds for any other criteria air pollutant. Therefore, the Proposed Project, in combination with past, present, and reasonably foreseeable future projects would result in less-than-significant cumulative impacts to air quality.

4.3.3.5 Mitigation Measures

As described above, the Proposed Project would not result in any significant air quality impacts, and therefore, no mitigation measures are required.

4.3.4 References

B&V and SCWD (Black & Veatch and Santa Cruz Water Department). 2020. Technical Data Inputs for EIR. June. (See Appendix B.)

CAPCOA (California Air Pollution Control Officers Association). 2017. *California Emissions Estimator Model (CalEEMod) User's Guide Version 2016.3.2*. Prepared by BREEZE Software, A Division of Trinity Consultants in collaboration with South Coast Air Quality Management District and the California Air Districts.

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

CARB. 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005.

CARB. 2016. "Ambient Air Quality Standards." May 4, 2016. Accessed October 2018 at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

CARB. 2017. "Inhalable Particulate Matter and Health ($PM_{2.5}$ and PM_{10})" August 2017. Accessed January 2019 at https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health.

CARB. 2018a. "Ambient air quality data." [digital CARB data]. iADAM: Air Quality Data Statistics. Accessed January 2019 at https://ww2.arb.ca.gov/resources/background-air-quality-standards.

CARB. 2018b. "Maps of State and Federal Area Designations." Maps last updated October 2018. Accessed June 3, 2020 at http://www.arb.ca.gov/desig/adm/adm.htm.

CARB. 2019a. "Glossary." Accessed January 2019 at https://ww2.arb.ca.gov/about/glossary.

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

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

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

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

CARB. 2019f. "Overview: Diesel Exhaust and Health." Accessed May 2019 at https://www.arb.ca.gov/research/diesel/diesel-health.htm.

EPA (U.S. Environmental Protection Agency). 2009. *Integrated Science Assessment for Particulate Matter.* EPA/600/R-08/139F. Research Triangle Park, North Carolina. December 2009.

EPA. 2013. *Integrated Science Assessment for Ozone and Related Photochemical Oxidants*. EPA/600/R-10/076F. Research Triangle Park, North Carolina. February 2013.

EPA. 2016. *Integrated Science Assessment for Oxides of Nitrogen—Health Criteria*. EPA/600/R-15/068. Research Triangle Park, North Carolina. January 2016.

EPA. 2018a. "Criteria Air Pollutants." March 8, 2018. Accessed June 3, 2020 at https://www.epa.gov/criteria-air-pollutants.

EPA. 2018b. "EPA Region 9 Air Quality Maps and Geographic Information." September 28, 2018. Accessed October 2018 at http://www.epa.gov/region9/air/maps.

EPA. 2018c. "Air Data: Access to Air Pollution Data." July 31, 2018. Accessed January 2019 at https://www.epa.gov/outdoor-air-quality-data.

MBARD (Monterey Bay Air Resources District). 2005. *2005 Report on Attainment of the California Particulate Matter Standards in the Monterey Bay Region*. December 1, 2005.

MBARD. 2007. *2007 Federal Maintenance Plan for Maintaining the National Ozone Standard in the Monterey Bay Region.* Approved March 21, 2007.

MBARD. 2008. *CEQA Air Quality Guidelines*. Adopted October 1995 and latest revision in February 2008.

MBARD. 2017. *2012-2015 Air Quality Management Plan*. Adopted March 15, 2017.

MBARD. 2018. Personal communication via email with David Frisbey, Planning and Air Monitoring Manager with MBARD. August 20, 2018.

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