4.2 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

This section analyzes impacts of the proposed *Parks Master Plan 2030* (Project) related to air pollutant emissions, including greenhouse gas (GHG) emissions. The section describes federal, state, and local regulations related to air quality and applicable to the Project. Existing conditions in the study area are described.

Public and agency comments were received during the public scoping period in response to the Notice of Preparation (NOP). No comments were received regarding air quality or greenhouse gas emissions. Public comments received during the public scoping period are included in Appendix A.

4.2.1 Environmental Setting

Regulatory Setting

Air quality within the Monterey Bay region is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies, as discussed below, work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy making, education, and a variety of programs.

Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the United States Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The standards identify levels of "criteria pollutants" that are regarded as the maximum levels of ambient (background) air pollutants considered to have an adequate margin of safety necessary to protect the public health and welfare. The standards are designed to protect the most sensitive people from illness or discomfort. Criteria pollutants 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 (SO_4), hydrogen sulfide (H_2S), vinyl chloride, and visibility-reducing particles are also regulated as criteria air pollutants. An area is designated as "in attainment" when it is in compliance with the federal and/or state standards as further discussed below.

Federal. The federal Clean Air Act (FCAA), 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 FCAA, including setting National Ambient Air Quality Standards (NAAQS) for criteria air pollutants; setting hazardous air pollutant standards; approving state attainment plans; setting motor vehicle emissions standards; issuing stationary source emissions standards and permits; and establishing acid rain control measures, stratospheric O_3 protection measures, and enforcement provisions.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of 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 FCAA requires the EPA to reassess the NAAQS at least every five 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.

State. The FCAA delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. The CARB, a department of the California Environmental Protection Agency (CalEPA), oversees air quality planning and control throughout California. Its responsibility lies with ensuring compliance with the California Clean Air Act (CCAA) and its amendments, as well as responding to the FCAA requirements and regulating emissions from motor vehicles sold in California. It also sets fuel specifications to further reduce vehicular emissions. CARB establishes the California Ambient Air Quality Standards (CAAQs), pursuant to the CCAA, which are generally more restrictive than the NAAQS. These standards apply to the same criteria pollutants as the FCAA and also include SO_4, H_2S, visibility reducing particles, and vinyl chloride.

The CAAQs describe adverse conditions; pollution levels must be below these standards before an air basin can attain the standard. 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}, $PM_{2.5}$, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded.

Regional. Regulatory oversight for air quality in the North Central Coast Air Basin (NCCAB) in which the City of Santa Cruz is located, rests at the regional level with the Monterey Bay Air Resources District (MBARD), formerly the Monterey Bay Unified Air Pollution Control District (MBUAPCD),[1] the CARB at the state level, and the EPA Region IX office at the federal level. The MBARD is one of 35 air districts established to protect air quality in California. The NCCAB is comprised of Santa Cruz, Monterey, and San Benito Counties. The MBARD has primary responsibility for local air quality by controlling air pollution from stationary sources of air pollution. The District has adopted a number of rules affecting both stationary and area-wide sources of emissions for the purpose of achieving the state and federal ambient air quality standard (AAQS) for O_3.

The CCAA requires each nonattainment district in the state to adopt a plan showing how the CAAQS for O_3 would be met with subsequent updates every three years. The MBARD adopted its first Air Quality Management Plan (AQMP) in 1991. The most recently adopted plan is the *2012-2015 AQMP* (Monterey Bay Air Resources District, March 2017).

[1] The District has changed its name to the Monterey Bay Air Resources District (MBARD). In this report, references to agency publications or guidance that predate the official name change use MBUAPCD.

Toxic Air Pollutants

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

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

State. The state Air Toxics Program was established in 1983. The California TAC list identifies more than 700 pollutants, of which carcinogenic and non-carcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. The state list includes the federal HAPs. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. 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, are required to communicate the results to the public in the form of notices and public meetings.

Diesel particulate matter (DPM) was identified as a TAC by the state of California in 1998. The CARB developed a comprehensive strategy to control DPM emissions. In 2000, CARB approved a Diesel Risk Reduction Plan to reduce diesel emissions from new and existing diesel-fueled vehicles and engines. The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk by 2020 compared with to the diesel risk in 2000 (CARB 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, and the In Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment.

Regional. Air quality control agencies, including the MBARD, must incorporate air toxics control measures into their regulatory programs or adopt equally stringent control measures as rules within six months of adoption by CARB. The MBARD also regulates TACs from new or modified sources under Rule 1000, a Board-approved protocol that applies to any source which requires a permit to construct or operate pursuant to MBARD regulations and has the potential to emit carcinogenic or noncarcinogenic TACs. The MBARD's Rule 1000 also requires sources of carcinogenic TACs to install best control technology and reduce cancer risk to less than one incident per 100,000 population. Sources of noncarcinogenic TACs must apply reasonable control technology. The MBARD also implements Rule 1003, Air Toxic Emissions Inventory and Risk Assessments, which establishes and implements the Air Toxics Hot Spots Act. Rule 1003 also requires that any increased cancer risk resulting from an existing facility's emissions is less than one incident per 100,000 population (Monterey Bay Unified Air Pollution Control District, February 2008).

Regional Setting and Climate

The City and Project area are located within the NCCAB. The NCCAB, which is just south of the San Francisco Bay Area Air Basin, covers an area of 5,159 square miles and consists of the counties of Santa Cruz, San Benito, and Monterey. Topography and meteorology heavily influence air quality. The northwest sector of the basin is dominated by the Santa Cruz Mountains, which exert a strong influence on atmospheric circulation, which results in generally good air quality. Small inland valleys such as Scotts Valley with low mountains on two sides have poorer circulation than at Santa Cruz on the coastal plain (Monterey Bay Unified Air Pollution Control District, February 2008).

The semi-permanent high-pressure cell in the eastern Pacific is the basic controlling factor in the climate of the NCCAB. In the summer, the high-pressure cell is dominant and causes persistent west and northwest winds over the entire California coast. Air descends in the Pacific High, forming a stable temperature inversion of hot air over a cool coastal layer of air. The onshore air currents pass over cool ocean waters to bring fog and relatively cool air into the coastal valleys. The warmer air aloft acts as a lid to inhibit vertical air movement (Monterey Bay Unified Air Pollution Control District, February 2008).

Effects of Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established AAQS, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. Effects of the pollutants of primary concern are discussed in the following paragraphs.

Ozone, the primary constituent of smog, is not directly emitted but is formed in the atmosphere over several hours from combinations of various precursors in the presence of sunlight. Nitrogen oxides (NO_x) and reactive organic gases (ROGs, also termed volatile organic compounds or VOCs) are considered to be the primary compounds, or precursors, contributing to the formation of ozone.

Ozone is viewed as both a secondary pollutant and a regional pollutant. The primary sources of ROG within the planning area are on- and off-road motor vehicles, cleaning and surface coatings, solvent evaporation, landfills, petroleum production and marketing, and prescribed burning. The primary sources of NOx in the NCCAB are on- and off-road motor vehicles and stationary source fuel combustion (Monterey Bay Air Resources District, March 2017). Short-term exposure to O_3 results in injury and damage to the lung, decreases in pulmonary function, and impairment of immune mechanisms (Monterey Bay Unified Air Pollution Control District, February 2008).

Coarse particulates refer to particulate matter less than 10 microns in diameter (PM_{10}). In 1997, EPA adopted a fine particulate matter standard of 2.5 microns or less in diameter ($PM_{2.5}$), and CARB adopted an annual $PM_{2.5}$ standard in 2002. PM_{10} and $PM_{2.5}$ are respirable particulate matter that are classified as primary or secondary depending on their origin. Primary particles are unchanged after being directly emitted (e.g., road dust) and are the most commonly analyzed and modeled form of PM_{10}. Because it is emitted directly and has limited dispersion characteristics, this type of PM_{10} is considered a localized pollutant. In addition, secondary PM_{10} can be formed in the atmosphere through atmospheric chemical and photochemical reactions.

PM_{10} and $PM_{2.5}$ are respirable particulate matter and because of their small size, they can be inhaled deep into the lungs and are therefore a health concern. Key health effects categories associated with PM include premature mortality; aggravation of respiratory and cardiovascular disease; changes in lung function and increased respiratory symptoms; and altered respiratory defense mechanisms (Monterey Bay Unified Air Pollution Control District, February 2008).

Carbon monoxide (CO) is an odorless, colorless gas that is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. Because it is directly emitted from combustion engines, CO can have adverse localized impacts, primarily in areas of heavy traffic congestion. Because it is emitted directly and has limited dispersion characteristics, CO is considered a localized pollutant (Monterey Bay Unified Air Pollution Control District, February 2008).

When CO combines with hemoglobin in the blood, the oxygen-carrying capacity of the blood is reduced, and the release of oxygen is inhibited or slowed. This condition puts the following at risk: patients with angina, persons with other cardiovascular diseases, chronic obstructive lung disease, or asthma; persons with anemia, and fetuses. At higher levels, CO also affects the central nervous system. Symptoms of exposure may include headaches, dizziness, sleepiness, nausea, vomiting, confusion, and disorientation (Monterey Bay Unified Air Pollution Control District, February 2008). At high concentrations, CO can reduce the oxygen-carrying capacity of the blood and cause unconsciousness and death.

Existing Air Quality Conditions

Ambient Air Quality Standards

As indicated above, AAQS are set to establish levels of air quality that must be maintained to protect the public from the adverse effects of air pollution. State standards are established to protect public health, including the most sensitive members of the population. National standards include a primary standard to protect public health and a secondary standard to protect the public welfare including property, vegetation, and visibility. As indicated above, the federal and state governments have established AAQS for six criteria pollutants: ozone, CO, NO_2, SO_2, PM_{10}, PM_{25}, and lead. State standards also include SO_4, H_2S, visibility reducing particles, and vinyl chloride.

Local Ambient Air Quality and Attainment Status

Ambient air quality is monitored at nine stations within the NCCAB. The network includes seven stations operated by the MBARD and one station operated by the National Park Service at the Pinnacles National Monument. The monitoring stations operated by the MBARD are part of the State and Local Air Monitoring Systems (SLAMS) network, and are located in Santa Cruz, Scotts Valley, Felton, Hollister, Carmel Valley, Salinas, King City, and the Pinnacles National Monument. The MBARD also carries out wood smoke monitoring as needed, including seasonal monitoring of wood stove use in areas like the San Lorenzo Valley area in Santa Cruz County, large controlled burns such as those conducted at Fort Ord and some of those conducted for agricultural management, and for catastrophic events such as large structural fires and wildfires.

Designations in relation to state standards are made by the CARB, while designations in relation to national standards are made by the EPA. State designations are updated annually, while the national designations are updated either when the standards change or when an area requests re-designation due to changes in air quality. Designations are made according to air basin, and in some cases designations are made at the county level. Designations are made for each criteria pollutant according to the categories listed below. Nonattainment designations are of most concern because they indicate that unhealthy levels of the pollutant exist in the area, which typically triggers a need to develop a plan to achieve the applicable standards.

- Attainment – Air quality in the area meets the standard.
- Nonattainment Transitional – Air quality is approaching the standard (State only).
- Nonattainment – Air quality in the area fails to meet the applicable standard.
- Unclassified – Insufficient data to designate area, or designations have yet to be made.

Table 4.2-1 summarizes the attainment status for criteria pollutants in the NCCAB. In summary, the NCCAB is designated as a nonattainment area for the state O_3 and PM_{10} standards. The NCCAB is designated as unclassified or attainment for all other state and federal standards (California Air Resources Board, October 2017; U.S. Environmental Protection Agency, June 2018).

CO emissions are generated by motor vehicles from traffic. Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Air pollutant monitoring data indicate that CO levels have been at healthy levels (i.e., below state and federal standards) for years, reflecting improvements in tailpipe emissions controls. As a result, the region has been designated as attainment/unclassified for the standard. Ambient air quality monitoring at a station in Santa Cruz measured CO concentrations and found that highest measured level over any eight-hour averaging period during the last three years is less than 1.0 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm (City of Santa Cruz, April 2012, DEIR volume).

TABLE 4.2-1: North Central Coast Air Basin Attainment Classification

Pollutant	Averaging Time	Designation/Classification
Federal 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
State Standards		
O_3	1 hour; 8 hours	Nonattainment (Transitional)[a]
NO_2	1 hour; annual arithmetic mean	Attainment
CO	1 hour; 8 hours	Monterey Co. – Attainment
		San Benito Co. – Unclassified
		Santa Cruz Co. – Unclassified
SO_2	1 hour; 24 hours	Attainment
PM_{10}	24 hours; annual arithmetic mean	Nonattainment
$PM_{2.5}$	Annual arithmetic mean	Attainment
Lead[b]	30-day average	Attainment
SO_4	24 hours	Attainment
H_2S	1 hour	Unclassified
Vinyl chloride[b]	24 hours	No designation
Visibility-reducing particles	8 hours (10:00 a.m.–6:00 p.m.)	Unclassified

Sources: CARB 2019.

Notes: CO = carbon monoxide; H_2S = hydrogen sulfide; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide; SO_4 = sulfates

[a] Nonattainment-transitional is a subcategory of the nonattainment designation category for state standards that indicates that the area is nearing attainment.

[b] CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined.

Odors

Odors represent emissions of one or more pollutants that are a nuisance to healthy persons and may trigger asthma episodes in people with sensitive airways. Pollutants associated with objectionable odors include sulfur compounds and methane. Typical sources of odors include landfills, rendering plants, chemical plants, agricultural uses, wastewater treatment plants, and refineries. Odors are a complex problem that can be caused by minute quantities of substances (Monterey Bay Unified Air Pollution Control District, February 2008). Because people have mixed reactions to odors, the nuisance level of an odor varies. There are no known sources of objectionable odors in the vicinity of City parks, open space and recreational areas.

Air Basin Plans

Air Quality Management Plan

The 1991 AQMP for the Monterey Bay Area was the first plan prepared in response to the CCAA of 1988 that established specific planning requirements to meet the O_3 standard. The Act requires that the AQMP be updated every three years. The most recent update is the *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 include the air quality trends analysis, emission inventory, and mobile source programs.

The NCCAB is a nonattainment 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 Particulate Plan, which was adopted in December 2005 and is summarized further below. Maintenance of the 8-hour NAAQS for O_3 is addressed in the District's "Federal Maintenance Plan for the Monterey Bay Region," which was adopted in March 2007 and also is summarized below.

A review of the air monitoring data for 2013-2015 indicates that there were fewer exceedance days compared to previous periods (Monterey Bay Air Resources District, March 2017). The long-term trend shows 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 (Ibid.).

The MBARD's *2012-2015 AQMP* identifies a continued trend of declining O_3 emissions in the NCCAB primarily related to lower vehicle miles traveled. Therefore, the MBARD determined progress was continuing to be made toward attaining the 8-hour O_3 standard during the three-year period reviewed (Monterey Bay Air Resources District, March 2017).

Federal Maintenance Plan

The "Federal Maintenance Plan" (May 2007) presents the strategy for maintaining the NAAQS for O_3 in the NCCAB. It is an update to the 1994 Federal Maintenance Plan, which was prepared for maintaining the 1-hour NAAQS for O_3 that since has been revoked and is superseded by the current

8-hour O_3 standard. Effective June 15, 2004, the U.S. EPA designated the NCCAB 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 VOC and NO_X, the two primary O_3 precursor gases, as explained above. A contingency plan is included to ensure that any future violation of the standard is promptly corrected (Monterey Bay Unified Air Pollution Control District, May 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 California 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 (Monterey Bay Unified Air Pollution Control District, December 2005). The 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.

Climate Change

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns recently have been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, attributed to accumulation of GHG emissions in the atmosphere. GHGs trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. Climate change models predict changes in temperature, precipitation patterns, water availability, and rising sea levels, and these altered conditions can have impacts on natural and human systems in California that can affect California's public health, habitats, ocean and coastal resources, water supplies, agriculture, forestry, and energy use.

Greenhouse Gas Emissions

GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), O_3, fluorinated gases (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3)), chlorofluorocarbons (CFCs), and hydrochlorofluorocarbons (HCFCs), in addition to water vapor.[2] Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Some industrial gases are also GHGs that

[2] California Health and Safety Code 38505 identifies seven GHGs that CARB is responsible to monitor and regulate to reduce emissions: CO_2, CH_4, N_2O, SF_6, HFCs, PFCs, and NF_3.

have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, PFCs, and SF_6, which are associated with certain industrial products and processes.

Per the U.S. EPA *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2016* (U.S. Environmental Protection Agency, April 2018), total U.S. GHG emissions were approximately 6,511.3 million metric tons (MMT) CO_2e[3] in 2016. The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 81.6% of total GHG emissions (5,310.9 MMT CO_2e). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.5% of CO_2 emissions in 2016 (4,966.0 MMT CO_2e). Relative to 1990, gross United States GHG emissions in 2016 are higher by 2.4%, down from a high of 15.7% above 1990 levels in 2007. GHG emissions decreased from 2015 to 2016 by 1.9% (126.8 MMT CO_2e), and, overall, net emissions in 2016 were 11.1% below 2005 levels (Ibid.).

According to California's 2000–2016 GHG emissions inventory (2018 edition), California emitted 429.40 MMT CO_2e in 2016, including emissions resulting from out-of-state electrical generation (California Air Resources Board, June 2018). The sources of GHG emissions in California include transportation, industrial uses, electric power production from both in-state and out-of-state sources, commercial and residential uses, agriculture, high global warming potential (GWP) substances, and recycling and waste. Between 2000 and 2016, per capita GHG emissions in California have dropped from a peak of 14.0 MT per person in 2001 to 10.8 MT per person in 2016, representing a 23% decrease. In addition, total GHG emissions in 2016 were approximately 12 MMT CO_2e less than 2015 emissions. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California will continue to reduce emissions below the 2020 target of 431 MT CO_2e (Ibid.).

California Regulations and Plans

The State of California passed the Global Warming Solutions Act of 2006 (AB 32), which requires reduction of GHG emissions generated within California. The Governor's Executive Order S-3-05 and AB 32 (Health and Safety Code, Section 38501 et seq.) both seek to achieve 1990 emissions levels by the year 2020. Executive Order (EO) S-3-05 further requires that California's GHG emissions be 80 percent below 1990 levels by the year 2050. Senate Bill (SB) 32 requires the CARB to ensure that statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030.

In 2007 the CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT CO_2e). In 2008, the CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (*Scoping Plan*) in accordance with Health and Safety Code

[3] The Intergovernmental Panel on Climate Change (IPCC) developed the Global Warming Potential (GWP) concept to compare the ability of each greenhouse gas to trap heat in the atmosphere relative to another gas. The reference gas used is CO_2, and GWP weighted emissions are measured in teragrams (or million metric tons) of CO_2 equivalent (Tg CO_2e). A million metric tons of CO_2 equivalent also is referenced as $MMTCO_2e$ (City of Santa Cruz, April 2012, DEIR volume).

Section 38561. The *Scoping Plan* establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020. CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (referred to as "Business-As-Usual" [BAU]).

The Scoping Plan identified 18 emissions-reduction measures that address cap-and-trade programs, vehicle gas standards, energy efficiency, low carbon fuel standards, renewable energy, regional transportation-related greenhouse gas targets, vehicle efficiency measures, goods movement, solar roofs program, industrial emissions, high speed rail, green building strategy, recycling, sustainable forests, water, and air. The key elements of the Scoping Plan include the following:

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
2. Achieving a statewide renewable energy mix of 33 percent;
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions;
4. Establishing targets for transportation related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
5. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard (LCFS 17 Cal. Code Regs. Section 95480 et seq.); and
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation.

In the 2011 Final Supplement to the *Scoping Plan's* Functional Equivalent Document, the CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, the CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7 percent (down from 28.5 percent) from the BAU conditions. When the 2020 emissions level projection was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewable Portfolio Standard (12 to 20 percent), the CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16 percent (down from 28.5 percent) from the BAU conditions.

In 2014, the CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (*First Update*). The stated purpose is to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050."

The *First Update* found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the state realizes the expected benefits of existing policy goals.

In conjunction with the *First Update*, the CARB identified "six key focus areas comprising major components of the state's economy to evaluate and describe the larger transformative actions that will be needed to meet the state's more expansive emission reduction needs by 2050." Those six areas are: 1) energy; 2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); 3) agriculture; 4) water; 5) waste management; and, 6) natural and working lands. The *First Update* identifies key recommended actions for each sector that will facilitate achievement of EO S-3-05's 2050 reduction goal. Based on the CARB's research efforts presented in the *First Update*, it has a "strong sense of the mix of technologies needed to reduce emissions through 2050." Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings and industrial machinery; decarbonizing electricity and fuel supplies; and, the rapid market penetration of efficient and clean energy technologies.

As part of the *First Update*, the CARB recalculated the state's 1990 emissions level using more recent GWPs identified by the Intergovernmental Panel on Climate Change. Using the recalculated 1990 emissions level (431 MMT CO_2e) and the revised 2020 emissions level projection identified in the 2011 Final Supplement, the CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15 percent (instead of 28.5 percent or 16 percent) from the BAU conditions. The update also recommends that a statewide mid-term target and mid-term and long-term sector targets be established toward meeting the 2050 goal established by EO S-3-05 (i.e., reduce California's GHG emissions to 80 percent below 1990 levels), although no specific recommendations are made. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California is on track to meet the 2020 target of 431 MMT CO_2e (California Air Resources Board, May 2014).

In November 2017, CARB adopted *California's 2017 Climate Change Scoping Plan Update (2017 Scoping Plan)* (California Air Resources Board, November 2017). The *2017 Scoping Plan* builds on the successful framework established in the initial *Scoping Plan* and *First Update*, while identifying new, technologically feasible and cost-effective strategies that will serve as the framework to achieve the 2030 GHG target and define the state's climate change priorities to 2030 and beyond. The strategies' "known commitments" include implementing renewable energy and energy efficiency, increased stringency of the Low Carbon Fuel Standard, measures identified in the Mobile Source and Freight Strategies, and measures identified in the proposed Short-Lived Climate Pollutant Plan. To fill the gap in additional reductions needed to achieve the 2030 target, it recommends continuing the Cap-and-Trade Program.

For local governments, the *2017 Scoping Plan* replaced the initial Scoping Plan's 15% reduction goal with a recommendation to aim for a community-wide goal of no more than 6 MT CO_2e per capita by 2030 and no more than 2 MT CO_2e per capita by 2050, which are consistent with the state's long-

term goals. These goals are appropriate for the plan level (city, county, subregional, or regional level, as appropriate), but not for specific individual projects because they include all emissions sectors in the State. The *2017 Scoping Plan* recognized the benefits of local government GHG planning (e.g., through climate action plans (CAPs)) and provide more information regarding tools the CARB is working on to support those efforts. It also recognizes the CEQA streamlining provisions for project level review where there is a legally adequate CAP.

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32, SB 32 and EO S-3-05 and establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. A project is considered consistent with the statutes if it meets the general policies in reducing GHG emissions in order to facilitate the achievement of the state's goals and does not impede attainment of those goals. As discussed in several cases, a given project need not be in perfect conformity with each and every planning policy or goals to be consistent. A project would be consistent, if it will further the objectives and not obstruct their attainment.

Local Climate Action Plans

In October 2012, the City adopted a *Climate Action Plan* (CAP) that outlines the actions the City will take over the next 10 years to reduce GHGs by 30 percent and to implement the policies and actions identified in the *General Plan 2030*. The CAP addresses citywide GHG reduction strategies. The CAP provides City emissions inventories, identifies an emissions reduction target for the year 2020, and includes measures to reduce energy use, reduce vehicle trips, implement water conservation programs, reduce emissions from waste collection, increase use of solar systems, and develop public partnerships to aide sustainable practices. Measures are outlined for the following sectors: municipal, residential, commercial, and community programs. None of the recommended measures are applicable to the proposed Project.

4.2.2 Impacts and Mitigation Measures

Thresholds of Significance

In accordance with CEQA; State CEQA Guidelines (including Appendix G); City of Santa Cruz plans, policies, and/or guidelines; and agency and professional standards; a project impact would be considered significant if the project would:

AIR-1 Conflict with or obstruct implementation of the air quality management plan;

AIR-2 Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard;

AIR-3 Expose sensitive receptors (i.e., residents, schools, hospitals) to substantial pollutant concentrations;

AIR-4 Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people;

GHG-1 Generate GHGs, either directly or indirectly, that may have a significant impact on the environment; or

GHG-2 Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

The MBARD has established thresholds of significance for criteria air pollutants of concern for construction and operations (Monterey Bay Unified Air Pollution Control District, February 2008). For construction, the threshold is 82 pounds per day of PM_{10} (due to construction with minimal earthmoving on 8.1 or more acres per day or grading/excavation site on 2.2 or more acres per day for 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 carbon monoxide, 150 pounds per day of sulfur oxides (SO_x), and 82 pounds per day of PM_{10} from on-site sources, pursuant to impact criteria for significance developed by the MBARD (Ibid.). Notably, as of June 2005, the NCCAB met all federal AAQS. As a result, it is no longer subject to federal conformity requirements (Ibid.).

With regard to GHGs, the State CEQA Guidelines do not prescribe specific methodologies for performing a GHG emissions assessment, establish specific thresholds of significance, or mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance that are consistent with the manner in which other impact areas are handled in CEQA. Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. There are currently no established thresholds for assessing whether the GHG emissions of a project in the NCCAB would be considered a cumulatively considerable contribution to global climate change, except the MBARD has an adopted guideline for stationary source projects in which a project would not have not a significant GHG emissions impact if the project emits less than 10,000 MT/year CO_2e or complies with regulations or requirements adopted to implement a statewide, regional or local plan for the reduction or mitigation of GHG emissions (Monterey Bay Air Resources District, February 2016).

Impacts and Mitigation Measures

Areas of No Project Impact

AIR-1 *Conflicts with Air Quality Management Plan*. The Air District's adopted procedure to determine project consistency with the AQMP is based on residential units. The proposed Project does not include residential units, and future implementation of recommended improvements at existing parks and recreational facilities would not result in significant vehicle trips or emissions. The proposed Project would not result in new population growth and would not conflict with or obstruct implementation of the AQMP. Therefore,

implementation of the Parks Master Plan 2030 would not result in conflicts with or obstruction of implementation of the AQMP, and the project would result in *no impact*.

AIR-4 *Odors.* According to the MBUAPCD CEQA Guidelines, land uses associated with odor complaints typically include landfills, agricultural uses, wastewater treatment plants, food processing plants, chemical plants, refineries, and landfills. The proposed Parks Master Plan includes recommendations for improvement of existing parks and recreational facilities. Neither adoption/implementation of the plan nor construction of recommended improvements would involve uses or construction activities that are generally associated with the creation of objectionable odors. There would be no long-term operations that would result in odors as none of the types of parks or recreational facilities contemplated in the plan would have activities that would result in the creation of objectionable odors. Potential new off-leash areas for dogs would be fenced, and trash receptacles are provided for dog waste, which would prevent/minimize odors potentially created by these uses. The Master Plan also calls for clear signage on rules and etiquette to minimize conflicts at off-leash areas to educating users of the importance of cleaning up waste. Parks Master Plan Goal III-Policy1, Action 6 calls for signage to educate dog owners of the importance of cleaning up waste to reduce odor impacts to parks and surrounding communities. Therefore, there would be *no impact* related to generation of odors.

GHG-2 *Conflicts with Climate Action Plan*. The project is consistent with the City's Climate Action Plan (CAP). Specifically, the Parks Master Plan's Goal I supports sustainably maintained parks and facilities throughout the City, and supporting policies and actions call for conservation of resources. Policy A, Action 1f, calls for increasing the number of trees and tree canopy within the City to increase carbon sequestration. Goal IV-Policy C, Action 3 supports continued implementation of the Climate Action Plan and Climate Adaptation Plan. Other actions support energy-efficient lighting and technologies, including potential installation of solar panels at some park facilities. These Master Plan components are consistent with measures and programs in the CAP that target energy and municipal GHG reductions. Therefore, the project would result in *no impact* as it would not conflict with an applicable GHG reduction plan.

Project Impacts

Impact AIR-2: **Project Emissions.** The proposed Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment. Therefore, this is a *less-than-significant* impact.

The proposed Project would not result in direct emissions as no development is proposed, but implementation of future improvements recommended in the Parks Master Plan could result in indirect emissions due to increased vehicle travel. However, vehicle or construction-related emissions would not result in an air quality violation or contribute significantly to existing air quality non-attainment explained as follows.

Recommendations in the proposed Parks Master Plan would not result in significant new development that would result in a substantial increase in vehicle trips or air emissions. Most improvements would improve existing or add new amenities at existing parks and recreational facilities. The Plan's goals and policies promote pedestrian and bicycle linkage between facilities. Most existing parks and recreational facilities are within walking distance of neighborhoods. (See also Section 16.) There are no significant new parks or recreational facilities that would generate traffic, leading to air emissions. None of the type of uses and improvements recommended in the Parks Master Plan would result in a stationary source of emissions.

The proposed Project does promote increased use at several parks. The Plan recommends increased programs and events/concerts at San Lorenzo Park, but this facility is regularly used for events that are often attended without a vehicle due to limited parking in the area, optimal trail access, and its central location near Downtown and public transit. Additionally, event holders rent the parking lots at the adjacent County Government Center. The Parks Master Plan recommends expansion of use of the Audrey Stanley Grove amphitheater at DeLaveaga Park for private and public events during the Santa Cruz Shakespeare off-season. A small amphitheater within an existing redwood grove is also recommended at Harvey West Park. This type of facility is envisioned as a short-term day use area that could accommodate small weddings or other ceremonies that would likely be using the Clubhouse or reservable picnic areas as the primary event location, as well as educational youth camp activities during the summer time. Harvey West Park is already booked for weddings and large gatherings, and the stage would serve to improve the experience of activities which are commonplace at the park.

The range and type of off-season events at the Audrey Stanley Grove amphitheater at DeLaveaga Park are not known, but based on previous environmental review of the facility, it is expected that events would be limited to an attendance level of 200 for events such as meetings and other non-music events that are likely to occur on weekends. Given limited use and frequency, traffic and resulting emissions are estimated to be limited and temporary without resulting in significant air emissions (City of Santa Cruz, December 2015). Should more substantial use be proposed in the future, additional environmental review would be required at the time of project-specific proposals. In accordance with the *General Plan 2030* and EIR, future development projects are required to conduct air emissions calculations where project size exceeds significant screening sizes presented in the AQMP to determine whether emissions exceed MBARD's adopted significance thresholds or potentially violate air quality standards.

The MBARD's "CEQA Air Quality Guidelines" indicate that 8.1 acres could be graded per day with minimal earthmoving or 2.2 acres per day with grading and excavation without exceeding the PM_{10} threshold of 82 pounds per day. Since the recommendations in the plan are mostly for improvements to existing facilities, grading that exceeds these limits is not expected. Even with potential new trail development as recommended in the plan, site preparation and/or grading would not reach this level.

Therefore, implementation of the proposed Parks Master Plan and future improvements would not result in substantial air emissions or cause a violation of air quality standards, resulting in a *less-than-significant impact*.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Impact AIR-3: **Sensitive Receptors.** The proposed Project would not expose sensitive receptors to substantial pollutant concentrations. Therefore, this is a *less-than-significant* impact.

Future parks improvements would not be expected to result in uses that typically could expose sensitive receptors to substantial pollutant concentrations. For CEQA purposes, a sensitive receptor is defined as any residence, including private homes, condominiums, apartments, and living quarters; education resources such as preschools and kindergarten through grade twelve (K-12) schools; daycare centers; and health care facilities such as hospitals or retirement and nursing homes (SOURCE V.5c). None of the type of uses and improvements recommended in the Parks Master Plan would result in a stationary source of emissions or expose sensitive receptors to substantial concentrations of pollutants.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Impact GHG-1: **Greenhouse Gas Emissions.** The proposed Project would not generate GHG emissions that may have a significant impact on the environment. Therefore, this is a *less-than-significant* impact.

The Parks Master Plan recommends park and recreational facility improvements, which, when designed and constructed, may generate GHG emissions from construction vehicles and equipment, and in limited cases from new vehicle trips. However, as discussed in Section 4.1-10, most parks are accessible by non-vehicular modes, and while some projects may increase vehicle trips, many of the improvements include multimodal elements that will provide non-vehicular modes of travel. New structural facilities, and subsequent energy use, also is limited to several restroom and accessory buildings. None of the recommended improvements would result in new stationary sources of emissions.

The level of analysis provided in this program EIR does not include quantification of GHGs that may result from implementation of specific projects recommended in the Parks Master Plan as expressed through the recommended actions and improvement projects. Any attempt to do so would be too speculative in nature, because specific projects are not designed at this time and such quantification would require a level of design detail to determine the type and quantity of construction equipment required. Currently, any such estimates would be speculative, but future projects subject to CEQA

will provide such detail for analysis as may be required. Potential emission sources, however, can be described in general terms and provided as follows.

Furthermore, the proposed Parks Master Plan includes policies and actions that would result in offsets to any minimal increase in GHG emissions that may occur as a result of implementation of the Plan. A key goal of the Parks Master Plan is to create and strengthen connections to and around parks and recreation facilities and community destinations. New construction also is subject to the City's green building requirements that require the use of green technologies and materials designed to reduce GHG emissions. The Parks Master Plan's policies and actions include actions to climate change. Specific policies and actions include those listed below. It is also noted that Goal VI supports an integrated park system that in part provides a means for alternative transportation.

- ❒ *Goal I-Policy A, Action 1f:* Increase the number of trees and tree canopy to increase carbon sequestration.
- ❒ *Goal I-Policy A, Action 2:* Action 2 identifies energy conserving practices to reduce energy use, including computer-controlled, energy-efficient lighting in parks and facilities and installation of solar products or panels.
- ❒ *Goal I-Policy A, Action 2c:* Implementation of the CAP's short-term and long-term projects.
- ❒ *Goal IV-Policy A, Action 4d:* Increase the tree canopy to increase bird nesting opportunities, improve air quality, decrease heat island effect, and increase carbon sequestration.

Global climate change is not confined to a particular project area and is generally accepted as the consequence of global industrialization over the last 200 years. A typical project, even a very large one, does not generate enough GHG emissions on its own to influence global climate change significantly; hence, the issue of global climate change is, by definition, a cumulative environmental impact. The State of California, through its governor and its legislature, has established a comprehensive framework for the substantial reduction of GHG emissions. This will occur primarily through the implementation of AB 32, Executive Order S-3-05, and SB 375, which will address GHG emissions on a statewide cumulative basis.

Therefore, implementation of the Parks Master Plan and future park and recreational projects is not anticipated to generate substantial GHG emissions at a level that may have a significant impact on the environment (measured here by whether such increases would hinder the City's ability to implement programs in its CAP or the state's ability to meet AB 32 goals for reduction of GHGs). Many of the recommendations in the Master Plan, if implemented, would lead to less GHG emissions as older infrastructure is replaced with technologies and designs which conserve water and energy. Additionally, improvements and projects developed in accordance with recommendations in the Parks Master Plan would serve the City's population, and City growth and impacts were evaluated in the *General Plan 2030* EIR, which concluded that GHG impacts would be less than significant.

Therefore, the project is expected to result in a *less-than-significant impact* related to GHG emissions. Additionally, emissions are expected to be at least partially offset with implementation of the state's

Scoping Plan strategies to improve fuel and vehicle efficiency standards. Therefore, GHG emissions resulting from future park improvements projects are not considered significant, and the project's incremental effect is less than cumulatively considerable.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

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