

## 3.7 Greenhouse Gas Emissions

### 3.7.1 Introduction

This section addresses the existing greenhouse gas (GHG) emissions conditions and presents an evaluation of the potential GHG emissions effects from implementation of the project. The GHG emissions analysis is based on GHG emissions modeling of project construction and operation activities. Modeling assumptions and calculations are provided in Appendix C.

### 3.7.2 Scoping Comments

Comments related to GHG emissions impacts were received during the public scoping process. These comments and the location where they are addressed in the GHG emissions analysis are provided in Table 3.7-1.

**Table 3.7-1 Greenhouse Gas Emissions Scoping Comments**

Agency/Entity	Comment	Location in GHG Emissions Section that Comment is Addressed
California State Lands Commission	A GHG emissions analysis consistent with the California Global Warming Solutions Act (Assembly Bill [AB] 32) and required by the State CEQA Guidelines should be included in the Draft EIR. This analysis should identify a threshold for significance for GHG emissions, calculate the level of GHGs that will be emitted as a result of construction and ultimate build-out of the Project, determine the significance of the impacts of those emissions, and, if impacts are significant, identify mitigation measures that would reduce them to the extent feasible. For the proposed Project, the removal and disposal of the concrete in Unit 2 may result in substantial emissions.	Section 3.7.6 and Appendix C

### 3.7.3 Environmental Setting

#### Climate Change

##### Overview

Global climate change refers to changes in average climatic conditions on earth as a whole, including changes in temperature, wind patterns, precipitation, and storms. Historical records indicate that global climate changes have occurred in the past due to natural phenomena; however, current data increasingly indicate that current global conditions differ from past climate changes in rate and magnitude. Global climate change attributable to anthropogenic (human) GHG emissions is currently one of the most important scientific, economic, and political issues in the United States and the world. The appropriate actions to limit and/or

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respond to climate change are the subject of significant and rapidly evolving regulatory efforts at the federal and state levels of government.

The scientific community's understanding of the fundamental processes responsible for global climate change has improved over the past decade, and its predictive capabilities are advancing. However, there remain significant scientific uncertainties in, for example, predictions of local effects of climate change; occurrence, frequency, and magnitude of extreme weather events; effects of aerosols; changes in clouds; shifts in the intensity and distribution of precipitation; and changes in oceanic circulation. Due to the complexity of the Earth's climate system and inability to accurately model it, the uncertainty surrounding climate change may never be completely eliminated. Nonetheless, the International Panel on Climate Change's (IPCC) *Fifth Assessment Report, Summary for Policy Makers* states, "It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forces together" (IPCC, 2014). A report from the National Academy of Sciences concluded that 97 to 98 percent of the climate researchers most actively publishing in the field support the tenets of the IPCC in that climate change is very likely caused by human (i.e., anthropogenic) activity (Anderegg, Prall, Harold, & Schneider, 2010).

#### Effects of Climate Change

Some of the effects of global warming in California are likely to include loss of snowpack, reduced water availability, declining crop yields, sea-level rise, more extreme heat days per year, more high ozone days, more large forest fires, more drought years, increased erosion of California's coastlines and sea-water intrusion into the Sacramento and San Joaquin Deltas and associated levee systems, and increased pest infestation (CARB, 2008; USEPA, 2016). Globally, climate change has the potential to adversely affect numerous environmental resources through impacts related to future air temperatures and precipitation patterns. According to the IPCC, the projected effects of global warming on weather and climate are likely to vary regionally but are expected to include the following direct effects (IPCC, 2014):

- Warmer and/or fewer cold days and nights over most land areas
- Warmer and/or more frequent hot days and nights over most land areas
- Warm spells/heat waves, including increased frequency and/or duration over most land areas
- Heavy precipitation events, including increased frequency, intensity, and/or amount of heavy precipitation
- Increase in intensity and/or duration of drought
- Increase in intense tropical cyclone activity
- Increased incidence and/or magnitude of extreme high sea level

Climate change is projected to cause many secondary effects as well, including global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully

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understood and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

### Sources of Greenhouse Gas Emissions

There are two broad sources of GHG emissions: anthropogenic and biogenic.

- Anthropogenic GHG emissions derive from the combustion of fossil fuels. Energy-related CO<sub>2</sub> emissions, resulting from fossil-fuel exploration and use, account for approximately 85 percent of the human-generated GHG emissions in the United States, primarily in the form of CO<sub>2</sub> emissions from burning fossil fuels (USEPA, 2017). Anthropogenic emissions also include byproducts of certain human-managed biological processes, such as anaerobic decomposition of organic waste in landfills, wastewater treatment, and treatment of wastes from confined animal facilities such as dairies. Indirect anthropogenic effects on GHG emissions includes changes in land use from uses with high levels of carbon sequestration, such as forests, to agricultural or urban uses.
- Biogenic GHG emissions are derived from natural sources, including the natural decomposition of biomass<sup>1</sup> and combustion of biomass or biomass-derived fuels.

The distinction between anthropogenic and biogenic sources of GHG emissions is important because these sources have different impacts on the global carbon cycle. Carbon in fossil-fuel reservoirs, such as coal seams and oil and gas deposits, was removed from the atmosphere by plants over millions of years. Through geologic processes, this carbon accumulated in deposits and was isolated from the active carbon cycle. Without human intervention, fossil-fuel carbon would remain isolated from the active carbon cycle into the future. Through extraction and combustion of fossil fuels, humans release this carbon, increasing the total amount of carbon in the atmosphere and in the active carbon cycle (USEPA, 2011).

In contrast to fossil-fuel carbon, carbon present in biomass is cycling through the atmosphere and global carbon cycle on a much faster scale. Over short time scales, the mass of carbon released by the decomposition of biomass will generally equal the mass of carbon taken up by living organisms. Because biogenic carbon is constantly being released and taken up in the carbon cycle, biogenic CO<sub>2</sub> emissions do not act to increase the total amount of carbon in the atmosphere in the same way as the release of carbon from fossil fuels (USEPA, 2011).

### Types of Greenhouse Gases

The greenhouse gas effect is responsible for maintaining a habitable climate. The most common GHGs are CO<sub>2</sub> and water vapor. Other critical GHGs include methane (CH<sub>4</sub>), nitrous oxide

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<sup>1</sup> Biomass is non-fossilized organic matter from plants, animals, and microorganisms, including products, byproducts, and wastes from agriculture, forestry and related industries as well as the non-fossilized biodegradable fractions of industrial and municipal wastes, including gases and liquids recovered from its decomposition.

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(N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). GHGs are released into the earth’s atmosphere through a variety of natural processes and human activities. Each GHG has its own potency and effect upon the earth’s energy balance, expressed in terms of a global warming potential (GWP). Some common emissions sources of GHGs are listed in Table 3.7-2. The GWPs provided in Table 3.7-2 are values based on the latest science in the IPCC’s Fifth Assessment Report (AR5) (IPCC, 2013).

As shown below, CO<sub>2</sub> is assigned a value of 1, and SF<sub>6</sub> is several orders of magnitude stronger, with a GWP of 23,500 (IPCC, 2013). In GHG-emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of equivalent CO<sub>2</sub> (CO<sub>2</sub>e). By applying the GWP ratios, project-related CO<sub>2</sub>e emissions can be tabulated in metric tons per year. Typically, the GWP ratio corresponding to the warming potential of CO<sub>2</sub> over a 100-year period is used as a baseline.

**Table 3.7-2 Greenhouse Gas Emissions Sources and GWP**

GHG	Example Source	GWP
CO <sub>2</sub>	Energy generation	1
CH <sub>4</sub>	Livestock; landfill operation	28
N <sub>2</sub> O	Transportation; crop fertilization	265
HFCs	Refrigeration and cooling	138 <sup>a</sup>
PFCs	Semi-conductor manufacturing	8,900 <sup>b</sup>
SF <sub>6</sub>	Gas-insulated switchgear	23,500

Notes:

<sup>a</sup> GWPs of HFCs range. This value was calculated for HFC-152a.

<sup>b</sup> GWPs of PFCs range. This value was calculated for PFC-218.

*Source: (IPCC, 2014)*

#### Greenhouse Gas Emission Inventory

##### National

Anthropogenic GHG emissions in the United States are derived mostly from the combustion of fossil fuels for transportation and power production. The total national anthropogenic GHG emissions in 2015 were approximately 6,587 million metric tons of CO<sub>2</sub>e. Energy-related CO<sub>2</sub> emissions resulting from fossil-fuel exploration and use account for more than three-quarters of the human-generated GHG emissions, primarily in the form of CO<sub>2</sub> emissions from burning fossil fuels. Twenty-nine percent of the GHG emissions were generated from electricity production, such as power plants; 27 percent from transportation; and 21 percent from industrial processes, while the remaining sources include agriculture, forestry, residential and commercial uses, and waste management (USEPA, 2017).

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### Statewide

Total gross estimated California GHG emissions in 2017 were 424 million metric tons of CO<sub>2</sub> equivalent (MTCO<sub>2</sub>e), five MMTCO<sub>2</sub>e lower than 2016 levels and seven MMTCO<sub>2</sub>e below the 2020 GHG Limit established by CARB in the 2014 Scoping Plan of 431 MMTCO<sub>2</sub>e (CARB, 2019a). Table 3.7-3 shows the Statewide GHG emissions for the years 1990 and 2017 (CARB, 2019b).

**Table 3.7-3 California Greenhouse Gas Inventory**

Source Category	1990 (million MTCO <sub>2</sub> e)	2017 (million MTCO <sub>2</sub> e)
Total energy	386.41	348.9
Industrial processes and product use	18.34	33.6
Agriculture, forestry and other land use	19.11	30.7
Waste	9.42	10.8
<b>Gross California GHG emissions</b>	<b>433.29</b>	<b>424.1</b>

*Sources: (CARB, 2007; CARB, 2017)*

During the 2000 to 2017 period, per capita GHG emissions in California dropped from a 2001 peak of 14.1 tons per person to 10.7 tons per person in 2017, a 24 percent decrease. The reductions in California GHG emissions during this period are attributed to energy efficiency and conservation efforts (CARB, 2019b).

### Regional

Total GHG emissions in the San Francisco Bay Area Air Basin (SFBAAB) steadily increased by 29 percent between 1990 and 2011, to a total of 86.6 MTCO<sub>2</sub>e in 2011, as shown in Table 3.7-4. Between 1990 and 2011, per capita emission rates in SFBAAB increased by approximately five percent (BAAQMD, 2015). Total emissions have increased since 1990 compared to both 2011 and 2015, but in 2015 total GHG emissions decreased approximately by two percent compared to 2011, as shown in Table 3.7-4 and Table 3.7-5.

### Local

Conversely to the overall SFBAAB, emissions in Marin County have declined since 1990, starting in 2010, with a decrease in emissions of 24 percent in 2017 compared to 1990 as shown in Table 3.7-6. Per capita GHG emissions have also decreased since 1990 (Marin County, 2019).

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**Table 3.7-4 SFBAAB Greenhouse Gas Inventory**

Source Category	1990 (million MTCO <sub>2</sub> e)	2011 (million MTCO <sub>2</sub> e)
Transportation	28.6	34.3
Industrial/commercial	21.0	31.0
Electricity/co-generation <sup>a</sup>	8.4	12.1
Residential fuel usage	7.0	6.6
Agriculture/farming	1.2	1.3
Off-road equipment	0.9	1.3
<b>Total SFBAAB GHG emissions</b>	<b>67.1</b>	<b>86.6</b>

<sup>a</sup> Includes imported electricity emissions of 2.7 million MTCO<sub>2</sub>e.

Source: (BAAQMD, 2015)

**Table 3.7-5 SFBAAB Greenhouse Gas Inventory (Percent)**

Source Category	2015
Transportation	41%
Industrial	26%
Electricity/co-generation	14%
Residential/commercial	10%
Agriculture/farming	1%
Recycling/waste	3%
High GWP gases	4%
<b>Total SFBAAB GHG emissions</b>	<b>100% (84.7 million MTCO<sub>2</sub>e)</b>

Source: (BAAQMD, 2017a)

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**Table 3.7-6 Marin County Greenhouse Gas Inventory**

Source Category	1990 (MTCO <sub>2</sub> e)	2017 (MTCO <sub>2</sub> e)
Transportation	193,544	157,523
Commercial energy	74,190	33,278
Residential energy	131,265	78,732
Agriculture	122,366	118,665
Off-road	19,300	17,127
Waste	14,414	17,301
Water	1,319	260
Wastewater	5,453	5,663
<b>Total Marin County GHG Emissions</b>	<b>561,851</b>	<b>428,549</b>

*Source: (Marin County, 2019)*

### Urban Microclimate

Vegetation and impervious surfaces have a significant effect on localized temperature and trees, and vegetation can minimize extreme air temperature. The first mechanism by which this occurs is that tree and vegetative cover shade impervious surfaces, preventing solar radiation from absorbing into the surface and preventing heat storage. Shade can minimize the urban heat-island effect, in which an urban area is significantly warmer than the surroundings due to reflective surfaces. Urban tree-canopy cover is critical in moderating the heat-island effect, which poses a threat to human health. The second mechanism is that trees transpire water, leading to transpirative cooling (McDonald, Kroeger, Boucher, Longzhu, & Salem, 2016). Impervious surfaces, conversely, cause an increase in localized temperatures. A study of the relationship between canopy cover and impervious cover and the effect on temperature found that, as impervious surface cover increased, temperature increased linearly. However, as canopy cover increased, temperature decreased at a greater rate than linearly (Ziter, Pedersen, Kucharik, & Tumer, 2019).

### 3.7.4 Regulatory Setting

The following laws, statutes, regulations, codes, and policies would apply to the project and are defined as standard conditions for the project.

#### Federal Regulations

##### United States Environmental Protection Agency – Clean Air Act

On April 2, 2007, the Supreme Court found in *Massachusetts v. USEPA* that GHGs are air pollutants under the Clean Air Act. USEPA, therefore, has the authority to regulate GHG emissions. The Supreme Court found that the Clean Air Act authorizes USEPA to regulate motor vehicle GHG emissions if USEPA determines they cause or contribute to air pollution

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that may reasonably be anticipated to endanger public health or welfare (USEPA, 2017). These GHG emissions should be evaluated as part of a project's GHG emissions inventory.

#### **State Regulations**

##### **California Air Resources Board – Global Warming Solutions Act of 2006 (Assembly Bill 32)**

In September 2006, the State legislature passed, and Governor Schwarzenegger signed, AB 32 (Chapter 488, States of 2006), the Global Warming Solutions Act of 2006, which set the 2020 GHG emissions-reduction goal into law. The Global Warming Solutions Act of 2006 directed CARB to begin developing discrete early actions to reduce GHG emissions while also preparing the Climate Change Scoping Plan (Scoping Plan), which outlines a framework of measures that would eventually be adopted and implemented to reach AB 32 goals (CARB, 2017). CARB approved the Scoping Plan in 2008 and updated it in May 2014 (Scoping Plan First Update). The project is subject to the regulations and implementation measures outlined in the Scoping Plan to achieve AB 32 goals.

In September of 2016, AB 32 was extended to achieve reductions in GHG of 40 percent below 1990 levels by 2030. Adopted regulations that correspond to elements of the Scoping Plan include the 33 percent Renewable Portfolio Standard by 2020 (SB X1-2), the Cap-and-Trade Program, and the Low Carbon Fuel Standard. The updated Scoping Plan identifies actions for each sector (i.e., energy, transportation, agriculture, water, waste management) that California should take to meet its climate-change goals. Recommended actions of the Scoping Plan First Update, relevant to the Program, within CARB's purview, are generally related to Transportation and to Natural and Working Lands (CARB, 2014). The newest Scoping Plan, adopted in 2017, (2017 Scoping Plan) describes ongoing and proposed programs and policies to achieve the 2030 GHG emissions target for several sectors (i.e., energy, transportation, industry, water, waste management, and natural and working lands) (CARB, 2017).

##### **California Air Resources Board – Sustainable Communities and Climate Protection Act of 2008 (Senate Bill 375)**

Senate Bill (SB) 375, signed by Governor Schwarzenegger in September 2008, aligns regional transportation planning efforts, regional GHG emission-reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy showing prescribed land-use allocation in each MPO's Regional Transportation Plan. CARB, in consultation with the MPOs, is to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in their respective regions for 2020 and 2035.

The applicable MPO in the project areas is the Metropolitan Transportation Commission (MTC). MTP, in conjunction with the Association for Bay Area Governments (ABAG), adopted Plan Bay Area in 2013, which includes the Bay Area region's Sustainable Communities Strategy and the 2040 Regional Transportation Plan. The project is subject to the regulations and implementation measures outlined in Plan Bay Area in 2013 and 2040 Regional Transportation Plan to achieve the goals of SB 375.



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### Regional and Local Regulations

#### Metropolitan Transportation Commission and the Association for Bay Area Governments

Pursuant to SB 375, the MTC and ABAG was tasked by CARB to achieve a 10 percent per capita reduction in passenger-vehicle generated transportation emissions by 2020 and a 16 percent per capita reduction by 2035 from 2005 levels, which CARB confirmed the region would achieve by implementing its Sustainable Communities Strategy.

MTC and ABAG have worked together to craft Plan Bay Area 2040, an update to the previous plan, to identify opportunities that can help steer the region toward the set goals. Plan Bay Area 2040 was adopted in July 2017 and integrates transportation, land use, and housing to meet greenhouse gas reduction targets set by CARB (MTC, 2017).

#### Marin County – Marin Countywide Plan

The following goals and policies in the Marin Countywide Plan are relevant to the project's GHG emissions (Marin County , 2007).

**Goal AIR-4: Minimization of Contributions to Greenhouse Gases.** Prepare policies that promote efficient management and use of resources in order to minimize greenhouse gas emissions. Incorporate sea level rise and more extreme weather information into the planning process.

*Policy AIR-4.1: Reduce Greenhouse Gas Emissions.* Adopt practices that promote improved efficiency and energy management technologies; shift to low-carbon and renewable fuels and zero emission technologies.

*Implementing Program AIR-4.c: Reduce Methane Emissions Released from Waste Disposal.* Encourage recycling, decrease waste sent to landfills, require landfill methane recovery, and promote methane recovery for energy production from other sources. (See Goal PFS-3.)

**Goal EN-3: Adopt Green Building Standards.** Integrate green building requirements into the development review and building permit process.

*Policy EN-3.1: Initiate Green Building Initiatives.* Encourage and over time increasingly require sustainable resource use and construction with nontoxic materials.

*Implementing Program EN-3.c: Divert Construction Waste.* Continue to implement and improve the Construction and Demolition Waste Recovery Ordinance, requiring building projects to recycle or reuse a minimum of 50% of unused or leftover building materials.

#### Marin County – Climate Action Plan

The Marin County Unincorporated Area Climate Action Plan 2030 Update was adopted by the Board of Supervisors on December 8, 2020. The Climate Action Plan 2030 Update outlines a

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path to reduce GHG emissions through the year of 2030. (Marin County , 2020). The Marin County Unincorporated Area Climate Action Plan 2030 includes two targets:

- Reduce GHG emissions from community activities in the unincorporated areas of Marin County by at least 60 percent below 2005 levels by 2030; and
- Reach net zero emissions by 2045.

The following strategies and actions are included in the 2030 Climate Action Plan that are related to GHG emission reduction.

#### **WR-C3: Construction & Demolition Debris and Self-Haul Waste:**

1. Require all loads of construction and demolition debris and self-haul waste to be processed for recovery of materials as feasible.

#### **AG-C3: Urban Forest and Food Production and Natural Lands Management:**

2. Improve ecosystem health by planting additional trees on County-owned land, including public parks, open space, medians, and rights of way.
4. Require that site planning, construction, and maintenance of new development preserve existing healthy trees and native vegetation on site to maximum extent feasible. Replace trees and vegetation not able to be saved, preferably with appropriate native species.

The 2030 Climate Action Plan includes a variety of regulatory, incentive-based, and market-based strategies that are expected to reduce GHG emissions from both existing and new development in Marin County. The GHG emissions inventory in the plan included emissions for off-road construction equipment (based on CARB’s OFFROAD model)<sup>2</sup> that apply to construction emissions in unincorporated Marin County.

#### **Town of Ross Climate Action Plan**

The Climate Action Plan describes the efforts and actions Ross can take to reduce its greenhouse gas emissions and mitigate, to the extent feasible at the local level, the potential impacts of climate change (Town of Ross, 2010). The recommended actions include the following:

- Support the Street Tree Committee’s efforts to develop and implement a community-wide tree planting program for streets and parks to significantly increase the carbon-storage potential of trees and other vegetation in the community.
- Encourage the use of fuel-efficient and low GHG-emitting vehicles and driver behaviors.

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<sup>2</sup> See <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation-0>.

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- Adopt and implement a policy requiring limitations on idling for commercial vehicles, construction vehicles, buses and other similar vehicles, beyond state law, where feasible.
- Continue to enforce policies and programs that regulate the removal and replacement of significant trees.
- To the extent possible, require new development to be planned around existing trees.
- Support the preservation and creation of conservation areas that provide carbon sequestration benefits, such as those with tree cover.

### 3.7.5 Impact Assessment Methodology

#### Significance Criteria

Consistent with State CEQA Guidelines Appendix G (Environmental Checklist) and Marin County Environmental Review Guidelines, the project would have a significant impact if it would:

- a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Given the specific location and nature of the project, impacts are analyzed in this section relative to the following additional threshold:

- c. Alter air movement, moisture, or temperature, or cause any change in climate.

#### Significance Thresholds

Due to the complex physical, chemical, and atmospheric mechanisms involved in global climate change, it is challenging to conclude that a project's increase in annual GHG emissions would cause a measurable change in global GHG emissions necessary to influence global climate change. According to CAPCOA, "GHG impacts are exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective" (CAPCOA, 2008). It is global GHG emissions in their aggregate that contribute to climate change, not any single source of GHG emissions alone. The GHG emissions of a single project alone would not likely cause a direct physical change in the environment.

For land use projects with operations that are not stationary sources, the BAAQMD's CEQA Guidelines recommend use of an operational significance threshold of 1,100 metric tons CO<sub>2e</sub> per year, and for stationary-source projects the recommended significance threshold is 10,000 metric tons CO<sub>2e</sub> per year (BAAQMD, 2017b). This threshold was developed with consideration of the AB 32 emission- reduction goals. Therefore, even though the project is not a typical land use development project, this EIR nonetheless uses the significance threshold of 1,100 metric tons CO<sub>2e</sub> per year to evaluate whether the project's GHG emissions could have a significant impact on the environment.

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It is acknowledged that this significance threshold was developed to focus on emissions reductions by 2020, and that BAAQMD staff and CARB have not yet provided guidance or recommendations for significance thresholds to evaluate consistency with emissions reduction goals for years beyond 2020; however, the 1,100 metric tons CO<sub>2</sub>e per year threshold can be used as a rough gauge to determine if the project would be consistent with these statewide GHG reduction goals.

The BAAQMD has not adopted a significance threshold for construction-related GHG emissions; however, it requires that the lead agency disclose those emissions and make a determination of impacts in relation to meeting AB 32 reduction goals. Construction-related GHG emissions from projects “occur over a relatively short-term period of time” and “contribute a relatively small portion of the overall lifetime project GHG emissions” (SCAQMD, 2008). In order to account for construction emissions and the fact that GHG emissions have long-lasting effects, technical guidance prepared by South Coast Air Quality Management District (SCAQMD) that has been accepted as the professional standard, recommends that construction GHG emissions should be “amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies.” In accordance with this technical guidance, GHG emissions generated from construction activities have been amortized over a projected 30-year lifetime of the project.

#### Approach to Impact Analysis

GHG emissions resulting from project-related incremental (net) increases in the use of off-road and on-road mobile vehicles were calculated and compared to existing conditions in order to evaluate project impacts. Project GHG emission calculations include project-construction activities such as demolition, hauling, and construction-worker trips. GHG emissions are estimated using CalEEMod, as described in detail in Section 3.2 Air Quality. Detailed calculations are provided in Appendix C of this Draft EIR. The average annual emissions from operational activities and amortized construction activities are compared to the BAAQMD annual emissions threshold.

#### 3.7.6 Impact Discussion

##### Impacts Analyzed

Impact 3.7-1: The project would generate greenhouse gas emissions but would have a less-than-significant impact on the environment.	Significance Determination
	Construction: Less than Significant
	Operation and Maintenance: Less than Significant

#### Vehicle and Equipment Emissions

GHG emissions would be generated primarily during project construction activities from the use of heavy-duty off-road construction equipment and automobile and truck trips to and from the project area required to transport workers, materials, and debris.

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Once constructed, the project would include maintenance activities, such as vegetation management, sediment and debris removal, and stormwater pump station and floodwall maintenance. These activities would not include ground--disturbing work. General maintenance and inspection activities would be similar to existing conditions, resulting in no new net GHG emissions. Operation of the pump station and backup generator would emit GHGs during operation of the project. Table 3.7-7 presents construction and operational emissions generated by the project. The total operational and 30-year amortized construction GHG emissions would be less than the BAAQMD operational threshold of 1,100 MT CO<sub>2e</sub> per year, as shown in Table 3.7-7. The impact would be less than significant.

**Table 3.7-7 Estimated GHG Emissions (metric tons CO<sub>2e</sub>)**

Unit	Project Element	Construction Emissions	Amortized Construction Emissions (30 years)	Operational Emissions	Total Annual Emissions
Unit 4	Fish ladder removal and Unit 4 grading	48.6	1.6	--	1.6
Unit 3	Frederick Allen Park	72.2	2.4	--	2.4
	Fish pools	100.5	3.4	--	3.4
	Floodwall (Segment #3)	20.3	0.7	--	0.7
	Stormwater pump station	25.9	0.9	17.7 <sup>a</sup>	18.6
	Floodwall (Segment #2)	12.2	0.4	--	0.4
Unit 2	Floodwall (Segment #1)	17.2	0.6	--	0.6
	Lower College of Marin concrete channel removal	46.9	1.6	--	1.6
<b>Total</b>		<b>343.8</b>	<b>11.5</b>	<b>17.7</b>	<b>29.1</b>
BAAQMD significance thresholds					1,100
Threshold exceeded?					No
<sup>a</sup> The emission calculation conservatively assumed up to 50 hours of operation for testing the backup generator and operation of the 40 hp pumps for up to 66 days per year, based on historical days of precipitation in the Town of Ross.					

#### Carbon Sequestration

Construction of the proposed project would involve removal of up to 369 trees from along the creek. The loss of these trees would constitute a loss of carbon sequestration and emissions of GHGs from decomposition of the chipped and cut material. The riparian habitat within Frederick Allen Park and the lower College of Marin concrete-channel-removal area would be enhanced and restored with natural vegetation. Up to 125 trees would be planted within Frederick Allen Park and more within the lower College of Marin area. A study of stream restoration in stream reaches across Marin, Napa, and Sonoma counties found that over a

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45-year period, 16,217<sup>3</sup> metric tons of CO<sub>2</sub>e accrued at a 1-kilometer representative stream restoration site (Lewis, 2015). In the short term, the proposed project would emit carbon from use of equipment, vehicles, and carbon losses through vegetation removal. Planting of trees and vegetation would occur as part of the proposed project. The restored creek habitat would result in increased sequestration of carbon in the long term compared to existing conditions ensuring that significant impacts on carbon sequestration would not occur. Furthermore, as analyzed in Section 3.3 Biological Resources, the District would need to implement **Mitigation Measure 3.3-2b: Tree Mitigation** for the tree removal, which requires planting of a greater number of trees than would be removed by the proposed project. In the long term, more trees would be growing in the region and sequestering carbon than under existing conditions. The impact on carbon sequestration would be beneficial over time and less than significant.

**Mitigation:** None required.

<b>Impact 3.7-2: The project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.</b>	<b>Significance Determination</b>
	<b>Construction: Less than Significant</b>
	<b>Operation and Maintenance: Less than Significant</b>

#### Climate Change Scoping Plan

The Climate Change Scoping Plan lays out the framework for achieving compliance with the 2030 Statewide GHG target of 40 percent below 1990 levels. The State has promulgated specific laws aimed at GHG reductions, with the goal of achieving the statewide GHG reduction targets. Table 3.7-8 contains a list of GHG-reducing strategies potentially applicable to the project. The analysis describes the consistency of the project with these strategies that support the State’s strategies in the Climate Change Scoping Plan to reduce GHG emissions. As shown below, the project would be subject to State and local requirements to reduce waste generation and reduce vehicle travel consistent with statewide strategies and regulations. As a result, the project would not conflict with applicable Climate Change Scoping Plan strategies and regulations to reduce GHG emissions.

Furthermore, in addition to the project’s consistency with applicable GHG-reduction strategies, the project would not conflict with the future anticipated statewide GHG-reductions goals. CARB has outlined a number of potential strategies for achieving the 2030 reduction target of 40 percent below 1990 levels. These potential strategies include renewable resources for half of the State’s electricity by 2030, increasing the fuel economy of vehicles and the number of zero -emission or hybrid vehicles, and reducing the rate of growth in vehicle miles traveled. The project would benefit from statewide and utility-provider efforts towards increasing the portion

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<sup>3</sup> Value is accounting only for carbon accrual, soil and vegetation nitrogen account for additional accrual above baseline conditions.

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**Table 3.7-8 Consistency with Applicable State Greenhouse Gas Reduction Strategies**

Strategy	Description	Discussion
<b>Energy</b>		
California Renewables Portfolio Standard and SB 350	Increases the proportion of electricity from renewable sources to 33 percent renewable power by 2020.	<b>Consistent.</b> During operations, the pumps would use electricity provided by PG&E, which has already achieved 33 percent renewables as of 2017 (CPUC, 2019) and is required to meet the 2050 performance standard.
<b>Mobile Sources</b>		
Pavley Regulations (AB 1493)	Reduces GHG emissions in new passenger vehicles from model year 2012 through 2016 (Phase I) and model years 2017–2025 (Phase II). Also reduces gasoline consumption to a rate of 31 percent of 1990 gasoline consumption (and associated GHG emissions) by 2020.	<b>Consistent.</b> Worker and other light-duty vehicles used during construction are required to comply with these regulations. No conflict would occur.
Low Carbon Fuel Standard (Executive Order S-01-07)	Establishes protocols for measuring life-cycle carbon intensity of transportation fuels and helps to establish use of alternative fuels.	<b>Consistent.</b> The project would be consistent with this regulation and would not conflict with implementation of the transportation fuel standards.
Advanced Clean Cars Program	In 2012, CARB adopted the Advanced Clean Cars (ACC) program to reduce criteria pollutants and GHG emissions for model year vehicles 2015 through 2025. ACC includes the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the Zero-Emission Vehicle (ZEV) regulation, which requires manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years.	<b>Consistent.</b> The standards would apply to all vehicles used by construction workers and maintenance workers associated with the project. No conflict would occur.
<b>Solid Waste</b>		
California Integrated Waste Management Act (IWMA) of 1989 and AB 341	The IWMA mandated that state agencies develop and implement an integrated waste-management plan that outlines the steps to be taken to divert at least 50 percent of their solid waste from disposal facilities. AB 341 directs CalRecycle to develop and adopt regulations for mandatory commercial recycling and sets a statewide goal for 75 percent disposal reduction by the year 2020.	<b>Consistent.</b> The demolition debris and soil, including the concrete, is anticipated to be recycled at the Marin Resource Recovery Center. Construction materials would be disposed of appropriately to meet recycling requirements. The project would comply with this regulation.

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of electricity provided from renewable resources. The project would also benefit from statewide efforts towards increasing the fuel economy standards of vehicles. While CARB is in the process of developing a framework for the 2030 reduction target in the Scoping Plan, the project would support or not impede implementation of these reduction strategies identified by CARB.

#### 2017 Clean Air Plan

As discussed in Section 3.2 Air Quality, one of the goals of BAAQMD’s 2017 CAP is to protect the climate by reducing GHG emissions. No additional control measures beyond those discussed in Section 3.2 Air Quality apply to the project. Although GHG emissions generated by project activities would increase compared to existing conditions, as shown in Table 3.7-7, the project would not conflict with the 2017 CAP goal to achieve the State’s GHG-reduction targets because GHG emissions would not exceed the BAAQMD significance threshold for GHGs. The project would comply with the BAAQMD GHG threshold identified to achieve the goals of the 2017 CAP.

#### Local GHG Reduction Plans and Policies

Marin County and Town of Ross have adopted climate action plans to reduce GHG emissions and meet the State’s AB 32 goals. The Marin County Countywide Plan and Climate Action Plan include a number of actions to direct construction and demolition debris to a certified facility for recycling, maintain healthy ecosystems, and replace removed trees with native species. Table 3.7-9 contains a list of GHG-reducing policies, actions, or programs potentially applicable to the project. The analysis describes the consistency of the project with these policies, actions, and programs that support Marin County and the Town of Ross’s regulations to reduce GHG-emissions.

**Table 3.7-9 Consistency with Applicable Local Greenhouse Gas Reduction Policies, Actions, and Programs**

Local Regulation	Policy/Action/Program	Discussion
<b>Natural System</b>		
Marin County Climate Action Plan Urban Forest and Food Production and Natural Lands Management Actions	Improve ecosystem health by planting additional trees on County-owned land, require siting planning, construction, and maintenance of new development, preserve existing healthy trees, and replace removed trees with native species.	<b>Consistent.</b> As part of the project, replacement trees and vegetation would be planted in the project area. The project would be required to plant more trees than those removed (as analyzed in Section 3.3 Biological Resources, Mitigation Measure 3.3-2b), ultimately increasing carbon sequestration in Marin County. No conflict would occur.
Town of Ross’s Climate Action Plan recommended action for Natural Systems, Sequestration and Carbon Offsets	Support the Street Tree Committee’s efforts to develop and implement a community-wide tree-planting program for streets and parks to significantly increase the carbon-storage potential of trees and other vegetation in the community.	



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Local Regulation	Policy/Action/Program	Discussion
<b>Mobile Sources</b>		
Town of Ross’s Climate Action Plan recommended actions for Land Use and Transportation	Encourage the use of fuel-efficient and low GHG-emitting vehicles and driver behaviors.  Adopt and implement a policy requiring limitations on idling for commercial vehicles, construction vehicles, buses, and other similar vehicles beyond state law, where feasible.	<b>Consistent.</b> The project would use vehicles that are in compliance with the Pavley Regulations and the ACC program adopted by the CARB to reduce criteria pollutant and GHG emissions.  Construction activities would comply with Section 2485 of the California Code of Regulations and Mitigation Measure 3.2-2 that requires limitations on idling of equipment and vehicles. No conflict would occur.
<b>Solid Waste</b>		
Marin County Climate Action Plan Waste Reduction Actions	Require all loads of construction and demolition debris and self-haul waste to be processed for recovery of materials as feasible.	<b>Consistent.</b> The District is anticipated to make use of the existing construction and demolition recycling infrastructure in the county by recycling the demolition debris and soil, including the concrete, at the Marin Resource Recovery Center. All other construction and demolition debris will be hauled to a certified facility for recycling. No conflict would occur.
Marin Countywide Plan Implementing Programs for Waste Disposal	Reduce methane emissions released from waste disposal, and divert construction waste	

#### Conclusion

In summary, the project is consistent with applicable regulatory plans and policies to reduce GHG emissions. The project would comply with strategies outlined in the Climate Change Scoping Plan (as shown in Table 3.7-8) and the 2017 Clean Air Plan. The project would be consistent with the goals and policies of the general plans and climate action plans of Marin County and Town of Ross. The impact would be less than significant.

**Mitigation:** None required.

<b>Impact 3.7-3: The project would not significantly alter air movement, moisture, or temperature, or cause any change in climate.</b>	<b>Significance Determination</b>
	<b>Construction: Less than Significant</b>
	<b>Operation and Maintenance: Less than Significant</b>

The project would involve substantial changes to the Corte Madera Creek channel and banks, with the intent of reducing flood risk as well as improving fish passage, natural creek processes, and fish and riparian habitat. The project involves removal of up to 369 trees along the creek channel for construction of a riparian floodplain and installation of floodwalls to provide flood

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protection as well as removal of an existing concrete channel. The creek channel would be revegetated. These types of changes would result in short- and long-term alteration to the microclimate in the project area. In the short term, the removal of existing trees and vegetation is anticipated to result in an increase in localized temperatures due to the relationship between decreased canopy cover and increased temperatures (Ziter, Pedersen, Kucharik, & Tumer, 2019). However, a large segment of concrete channel would be removed, reducing the impervious surfaces in the area, reductions of which have been found to correlate to reduced temperatures. Additionally, as part of the project, new trees and vegetation would be planted on the project site, which would take approximately 10 years to grow to a size that would result in shading of the realigned concrete multi-use pathway. Although fewer trees may be planted than currently occur in the area under existing conditions, the reduction in concrete and replacement with vegetation would ensure that temperatures in the project area do not increase over the long term. The impact would be less than significant.

**Mitigation:** None required.

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