3.5 CLIMATE CHANGE

3.5.1 INTRODUCTION

This section covers the topic of global climate change and greenhouse gas emissions, describes existing conditions at and surrounding the project site, summarizes relevant regulations and policies, and analyzes the potential effects of implementing the Proposed Action and its alternatives on global climate.

Sources of information used in this analysis include:

- Placer Vineyards Specific Plan Second Partially Recirculated Revised EIR prepared by the Placer County (March 2007); and
- Draft National Environmental Policy Act (NEPA) Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions prepared by the Council on Environmental Quality (February 2010).

3.5.2 AFFECTED ENVIRONMENT

3.5.2.1 Background

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer) (U.S. EPA 2008a). Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of greenhouse gases (GHG) and other gases to the atmosphere from volcanic eruptions); and
- human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

According to some scientists, human activities have resulted in a change in global climate. The primary manifestation of global climate change has been a rise in the average global tropospheric temperature of 0.2 degree Celsius (°C) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century (IPCC 2007). Changes to the global climate system and ecosystems, and to California, could include:

- summer warming projections in the first 30 years of the 21st century ranging from about 0.5 °C to 2 °C (0.9 °F to 3.6 °F) and by the last 30 years of the 21st century, from about 1.5 °C to 5.8 °C (2.7 °F to 10.5 °F) (Cal EPA 2006);
- declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (IPCC 2007);

- rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets (model-based projections of global average sea level rise at the end of the 21st century [2090–2099] range from 0.59 foot to 1.94 feet or 0.18 meter to 0.59 meter) (IPCC 2007);

- changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2007);

- declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (Cal EPA 2006);

- increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st century (Cal EPA 2006);

- increasing the potential for erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level (Cal EPA 2006);

- increasing pest infestation, making California more susceptible to forest fires (Cal EPA 2006); and

- increasing the demand for electricity by 1 to 3 percent by 2020 due to rising temperatures resulting in hundreds of millions of dollars in extra expenditures (Cal EPA 2006).

The natural process through which heat is retained in the troposphere[1] is called the "greenhouse effect." The greenhouse effect traps heat in the troposphere through a threefold process as follows: (1) short-wave radiation in the form of visible light emitted by the Sun is absorbed by the Earth as heat; (2) long-wave radiation is re-emitted by the Earth; and (3) GHGs in the upper atmosphere absorb or trap the long-wave radiation and re-emit it back towards the Earth and into space. This third process is the focus of current climate change actions because increased quantities of GHGs in the Earth's atmosphere causing more of the long-wave radiation to be trapped in the atmosphere.

Greenhouse Gases

Water vapor and carbon dioxide (CO_2) are the most abundant GHGs. In addition, there are other GHGs that occur in smaller amounts in the atmosphere but have a greater ability than CO_2 to absorb and re-radiate long-wave radiation. To gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-emit long-wave radiation over a specific period. The GWP of a gas is determined using CO_2 as the reference gas, which has a GWP of 1 over 100 years (IPCC 1996).[2] For example, a gas with a GWP of 10 is 10 times more potent than CO_2

1 The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface from 6 to 7 miles (10 to 11 kilometers).

2 All Global Warming Potentials are given as 100-year values.

over 100 years. The use of GWP allows GHG emissions to be reported using CO_2 as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as "carbon dioxide equivalents" (CO_2e). This essentially means that 1 metric ton of a GHG with a GWP of 10 has the same climate change impacts as 10 metric tons of CO_2.

GHGs of most concern include the following compounds:

- **Carbon Dioxide (CO_2)**. Anthropogenic carbon dioxide emissions are primarily generated by fossil fuel combustion from stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources over the past 250 years, the concentration of carbon dioxide in the atmosphere has increased 35 percent (U.S. EPA 2008b). Carbon dioxide is also generated by natural sources such as cellular respiration, volcanic activity, decomposition of organisms, and forest fires. Carbon dioxide is the most widely emitted GHG and is the reference gas (GWP of 1) for determining the GWP of other GHGs. In 2004, 82.8 percent of California's GHG emissions were carbon dioxide (California Energy Commission 2007).
- **Methane (CH_4)**. Methane is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of methane are landfills, natural gas systems, and enteric fermentation (U.S. EPA n.d.[a]). Methane is the primary component of natural gas, which is used for space and water heating, steam production, and power generation. The GWP of methane is 21.
- **Nitrous Oxide (N_2O)**. Nitrous oxide is produced by natural and human-related sources. Primary human-related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of nitrous oxide is 310.
- **Hydrofluorocarbons (HFCs)**. HFCs typically are used as refrigerants in both stationary refrigeration and mobile air conditioning. The use of HFCs for cooling and foam blowing is growing particularly as the continued phase-out of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) gains momentum. The GWP of HFCs ranges from 140 for HFC-152a to 6,300 for HFC-236fa.
- **Perfluorocarbons (PFCs)**. Perfluorocarbons are compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. Perfluorocarbons are potent GHGs with a GWP several thousand times that of carbon dioxide, depending on the specific PFC. Another area of concern regarding PFCs is their long atmospheric lifetime (up to 50,000 years) (Energy Information Administration 2007). The GWPs of PFCs range from 5,700 to 11,900.
- **Sulfur Hexafluoride (SF_6)**. Sulfur hexafluoride is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. Sulfur hexafluoride is the most potent GHG that has been evaluated by the Intergovernmental Panel on Climate Change with a GWP of 23,900. However, its global warming contribution is not as high as the GWP would indicate due to its low mixing ratio, as compared to carbon dioxide (4 parts per trillion [ppt] in 1990 versus 365 parts per million [ppm] of CO_2) (U.S. EPA n.d.[b]).

Contributions to Greenhouse Gas Emissions

Global

Worldwide anthropogenic (man-made) GHG emissions are tracked for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Man-made GHG emissions for Annex I nations are available through 2007. Manmade GHG emissions for Non-Annex I nations are available through 2005. The sum of these emissions totaled approximately 42,133 million metric tons of CO_2 equivalents ($MMTCO_2e$).[3] It should be noted that global emissions inventory data are not all from the same year and may vary depending on the source of the emissions inventory data.[4] The top five countries and the European Union accounted for approximately 55 percent of the total global GHG emissions according to the most recently available data (See **Table 3.5-1, Top Five GHG Producer Countries and the European Union (Annual)**). The GHG emissions in more recent years may differ from the inventories presented in **Table 3.5-1**; however, the data is representative of currently available global inventory data.

Table 3.5-1
Top Five GHG Producer Countries and the European Union (Annual)

Emitting Countries	GHG Emissions ($MMTCO_2e$)
China	7,250
United States	7,217
European Union (EU), 27 Member States	5,402
Russian Federation	2,202
India	1,863
Japan	1,412
Total	**25,346**

Source: World Resources Institute, "Climate Analysis Indicators Tool (CAIT)," http://cait.wri.org/. 2010.
Excludes emissions and removals from land use, land-use change, and forestry (LULUCF).
Note: Emissions for Annex I nations are based on 2007 data. Emissions for Non-Annex I nations (e.g., China, India) are based on 2005 data).

3 The CO_2 equivalent emissions commonly are expressed as "million metric tons of carbon dioxide equivalent ($MMTCO_2E$)." The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP, such that $MMTCO_2E$ = (million metric tons of a GHG) x (GWP of the GHG). For example, the GWP for methane is 21. This means that the emission of one million metric tons of methane is equivalent to the emission of 21 million metric tons of CO_2.

4 The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2005 data, the UNFCCC data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF," http://unfccc.int/ghg_emissions_data/ghg_data_from_unfccc/time_series_annex_i/ items/3841.php and "Flexible GHG Data Queries" with selections for total GHG emissions excluding LULUCF/LUCF, all years, and non-Annex I countries, http://unfccc.int/di/FlexibleQueries.do. n.d.

United States

As noted in **Table 3.5-1**, the United States was the number two producer of global GHG emissions. The primary GHG emitted by human activities in the United States was CO_2, representing approximately 84 percent of total GHG emissions (U.S. EPA 2008a). Carbon dioxide from fossil fuel combustion, the largest source of GHG emissions, accounted for approximately 80 percent of U.S. GHG emissions.[5]

State of California

CARB compiles GHG inventories for the State of California. Based on the 2008 GHG inventory data (i.e., the latest year for which data are available), California emitted 474 $MMTCO_2e$, including emissions resulting from imported electrical power in 2008 (CARB 2010). Based on the CARB inventory data and GHG inventories compiled by the World Resources Institute, California's total statewide GHG emissions rank second in the United States (Texas is number one) with emissions of 417 $MMTCO_2e$, excluding emissions related to imported power (CARB 2010).

The primary contributors to GHG emissions in California are transportation, electric power production from both in-state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities. **Table 3.5-2, GHG Emissions in California**, provides a summary of GHG emissions reported in California in 1990 and 2008 separated by categories defined by the United Nations Intergovernmental Panel on Climate Change (IPCC).

Between 1990 and 2008, the population of California grew by approximately 7.3 million (from 29.8 to 37.9 million) (U.S. Census Bureau 2010). This represents an increase of approximately 27.2 percent from 1990 population levels. In addition, the California economy, measured as gross state product, grew from $788 billion in 1990 to $1.8 trillion in 2008 representing an increase of approximately 128 percent (over twice the 1990 gross state product) (California Department of Finance 2009). Despite the population and economic growth, California's net GHG emissions only grew by approximately 11 percent. The California Energy Commission (CEC) attributes the slow rate of growth to the success of California's renewable energy programs and its commitment to clean air and clean energy (California Energy Commission 2006).

5 The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2005 data, the UNFCCC data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF," http://unfccc.int/ghg_emissions_data/ghg_data_from_unfccc/time_series_annex_i/ items/3841.php and "Flexible GHG Data Queries" with selections for total GHG emissions excluding LULUCF/LUCF, all years, and non-Annex I countries, http://unfccc.int/di/FlexibleQueries.do. n.d.

Table 3.5-2
GHG Emissions in California

Source Category	1990 ($MMTCO_2e$)	Percent of Total	2008 ($MMTCO_2e$)	Percent of Total
ENERGY	**386.41**	**89.2%**	**413.80**	**86.6%**
Energy Industries	157.33	36.3%	171.23	35.8%
Manufacturing Industries & Construction	24.24	5.6%	16.67	3.5%
Transport	150.02	34.6%	173.94	36.4%
Other (Residential/Commercial/Institutional)	48.19	11.1%	46.59	9.8%
Non-Specified	1.38	0.3%	0.00	0.0%
Fugitive Emissions from Oil & Natural Gas	2.94	0.7%	3.28	0.7%
Fugitive Emissions from Other Energy Production	2.31	0.5%	2.09	0.4%
INDUSTRIAL PROCESSES & PRODUCT USE	**18.34**	**4.2%**	**30.11**	**6.3%**
Mineral Industry	4.85	1.1%	5.35	1.1%
Chemical Industry	2.34	0.5%	0.06	0.0%
Non-Energy Products from Fuels & Solvent Use	2.29	0.5%	1.97	0.4%
Electronics Industry	0.59	0.1%	0.80	0.2%
Substitutes for Ozone Depleting Substances	0.04	0.0%	13.89	2.9%
Other Product Manufacture and Use	3.18	0.7%	1.66	0.3%
Other	5.05	1.2%	6.39	1.3%
AGRICULTURE, FORESTRY, & OTHER LAND USE	**19.11**	**4.4%**	**24.42**	**5.1%**
Livestock	11.67	2.7%	16.28	3.4%
Land	0.19	0.0%	0.19	0.0%
Aggregate Sources & Non-CO_2 Sources on Land	7.26	1.7%	7.95	1.7%
WASTE	**9.42**	**2.2%**	**9.41**	**2.0%**
Solid Waste Disposal	6.26	1.4%	6.71	1.4%
Wastewater Treatment & Discharge	3.17	0.7%	2.70	0.6%
EMISSIONS SUMMARY				
Gross California Emissions	433.29		477.74	
Sinks from Forests and Rangelands	-6.69		-3.98	
Net California Emissions	426.60		473.76	

Sources:
[1] *California Air Resources Board, "California Greenhouse Gas 1990-2004 Inventory by IPCC Category - Summary," http://www.arb.ca.gov/cc/inventory/archive/archive.htm. 2010.*
[2] *California Air Resources Board, "California Greenhouse Gas 2000-2008 Inventory by IPCC Category - Summary," http://www.arb.ca.gov/cc/inventory/data/data.htm. 2010.*

Global Ambient CO_2 Concentrations

Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of carbon dioxide, methane, and nitrous oxide from before the start of

industrialization, around 1750, to over 650,000 years ago. For that period, carbon dioxide concentrations ranged from 180 ppm to 300 ppm. For the period from around 1750 to the present, global carbon dioxide concentrations increased from a pre-industrialization period concentration of 280 ppm to 379 ppm in 2005, with the 2005 value far exceeding the upper end of the pre-industrial period range (California Energy Commission 2006a). Global methane and nitrous oxide concentrations show similar increases for the same period (see **Table 3.5-3, Comparison of Global Pre-Industrial and Current GHG Concentrations**).

Table 3.5-3
Comparison of Global Pre-Industrial and Current GHG Concentrations

Greenhouse Gas	Early Industrial Period Concentrations	Natural Range for Last 650,000 Years	2005 Concentrations
Carbon Dioxide (CO_2)	280 ppm	180 to 300 ppm	379 ppm
Methane (CH_4)	715 ppb	320 to 790 ppb	1774 ppb
Nitrous Oxide (N_2O)	270 ppb	NA	319 ppb

Source: Intergovernmental Panel on Climate Change, Climate Change 2007: The Physical Science Basis, Summary for Policymakers, (2007).
ppm=parts per million
ppb=parts per billion

3.5.3 REGULATORY FRAMEWORK – APPLICABLE LAWS, REGULATIONS, PLANS, AND POLICIES

3.5.3.1 Intergovernmental Panel on Climate Change

The World Meteorological Organization (WMO) and United Nations Environmental Program (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. The goal of the IPCC is to evaluate the risk of climate change caused by human activities. Rather than performing research or monitoring climate, the IPCC relies on peer-reviewed and published scientific literature to make its assessment. While not a regulatory body, the IPCC assesses information (i.e., scientific literature) regarding human-induced climate change and the impacts of human-induced climate change, and recommends options to policy makers for the adaptation and mitigation of climate change. The IPCC reports its evaluations in special reports called "assessment reports." The latest assessment report (i.e., Fourth Assessment Report, consisting of three working group reports and a synthesis report based on the first three reports) was published in 2007. In its 2007 report, the IPCC stated that global temperature increases since the mid-20th century were "very likely" attributable to man-made activities (greater than 90 percent certainty) (IPCC 2007).

3.5.3.2 Federal

The U.S. Environmental Protection Agency (U.S. EPA) adopted a mandatory GHG reporting rule in September 2009. The rule would require suppliers of fossil fuels or entities that emit industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to the U.S. EPA beginning in 2011 (covering the 2010 calendar year emission). Vehicle and engine manufacturers would begin reporting GHG emissions for model year 2011.

On September 15, 2009, the U.S. EPA and the Department of Transportation's (DOT) National Highway Traffic Safety Administration (NHTSA) issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. The proposed standards would be phased in and would require passenger cars and light-duty trucks to comply with a declining emissions standard. In 2012, passenger cars and light-duty trucks would have to meet an average emissions standard of 295 grams of CO_2 per mile and 30.1 miles per gallon. By 2016, the vehicles would have to meet an average standard of 250 grams of CO_2 per mile and 35.5 miles per gallon (U.S. EPA 2009). The final standards were adopted by the U.S. EPA and DOT on April 1, 2010.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations.

- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

While these findings do not impose additional requirements on industry or other entities, this action is a prerequisite to finalizing the U.S. EPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the U.S. EPA and the NHTSA. On April 1, 2010, the U.S. EPA and NHTSA issued final rules requiring that by the 2016 model-year, manufacturers must achieve a combined average vehicle emission level of 250 grams CO_2 per mile, which is equivalent to 35.5 miles per gallon as measured by U.S. EPA standards.

3.5.3.3 State

The State of California has implemented legislation targeting GHG emissions. Chief among these is the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32). AB 32 represents the first enforceable statewide program to limit GHG emissions from all major industries with penalties for noncompliance. AB 32 requires the State of California to reduce its emissions to 1990 levels by 2020. AB 32 establishes key deadlines for certain actions the State must take in order to achieve the reduction

target. The first action under AB 32 resulted in California Air Resources Board's (CARB) adoption of a report listing three specific early action GHG reduction measures on June 21, 2007. On October 25, 2007, CARB approved an additional six early action GHG reduction measures under AB 32.

As required under AB 32, on December 6, 2007, CARB approved the 1990 greenhouse gas emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 million metric tons of carbon dioxide equivalents ($MMTCO_2e$). The inventory revealed that in 1990, transportation, with 35 percent of the state's total emissions, was the largest single sector generating CO_2; followed by industrial emissions, 24 percent; imported electricity, 14 percent; in-state electricity generation, 11 percent; residential use, 7 percent; agriculture, 5 percent; and commercial uses, 3 percent (figures are based on the 1990 inventory). AB 32 does not require individual sectors to meet their individual 1990 GHG emissions inventory; the total statewide emissions are required to meet the 1990 threshold by 2020.

In addition to the 1990 emissions inventory, on December 6, 2007, CARB adopted regulations requiring the mandatory reporting of GHG emissions for large facilities. The mandatory reporting regulations require annual reporting from the largest facilities in the state, which account for approximately 94 percent of greenhouse gas emissions from industrial and commercial stationary sources in California. About 800 separate sources fall under the new reporting rules and include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 tons of CO_2 each year from on-site stationary combustion sources. Transportation sources, which account for 38 percent of California's total greenhouse gas emissions as of the 2002–2004 GHG inventory conducted by CARB, are not covered by these regulations but will continue to be tracked through existing means (CARB 2009). Affected facilities began tracking their emissions in 2008, and reported them beginning in 2009, with a phase-in process to allow facilities to develop reporting systems and train personnel in data collection. Emissions for 2008 could be based on best available emission data. Beginning in 2010, however, emissions reporting requirements became more rigorous and subject to third-party verification. Verification will take place annually or every three years, depending on the type of facility.

In December 2008, CARB adopted a Climate Change Scoping Plan indicating how emission reductions will be achieved from significant sources of GHGs via regulations, market mechanism, and other actions. The Climate Change Scoping Plan identifies 18 recommended strategies the state should implement to achieve AB 32.

CARB has identified ongoing programs and has adopted regulations for a number of individual measures to reduce GHG emissions in accordance with the *Climate Change Scoping Plan* strategies. Key elements of the *Climate Change Scoping Plan* include the following recommendations:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewable energy mix of 33 percent;

- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- 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; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

Under the *Climate Change Scoping Plan*, approximately 85 percent of the state's emissions are subject to a cap-and-trade program where covered sectors are placed under a declining emissions cap. Emission reductions will be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. It is expected that emission reductions from the cap-and-trade program will account for a sizeable portion of the reductions required by AB 32. The program has an enforceable compliance obligation beginning in 2013 for covered entities (i.e., cement, iron, and steel producers, electricity providers, petroleum refiners, and other stationary sources with greater than 25,000 metric tons of CO_2 equivalents [$MTCO_2e$] per year).

3.5.3.4 Regional

Placer County Air Pollution Control District

The Placer County Air Pollution Control District (PCAPCD) is the primary authority for regulating GHG emissions in the project area. The PCAPCD has adopted thresholds of significance for determining the potential impact for criteria pollutants and other air quality issues but not for GHG. However, the PCAPCD[6] has indicated that thresholds adopted by other air districts within California would be acceptable. The PCAPCD must also ensure compliance with AB 32 reduction targets, and therefore has GHG reporting requirements similar to other air districts within California.

Placer Vineyards Specific Plan

The Placer Vineyards Specific Plan (PVSP) includes policies and guidelines that would have an impact on GHG emissions from the Proposed Action. Generally these are measures meant to increase energy efficiency and alternative transportation (i.e., bicycles, walking, and mass transit). Both would reduce GHG emissions through reducing fossil fuel consumption for electricity production, personal transportation, and heating. Specific elements contained in the PVSP that address these issues are:

- Mixed use development, providing commercial services within close proximity to residences and thereby reducing vehicle traffic;
- Inclusion of Class I bicycle facilities, encouraging bicycle use and avoidance of vehicle use; and
- Installation of transit facilities along transit corridors and right of way provisions for transit.

6 Personal communication with Angel Rinker, Associate Planner at the PCAPCD, on February 10, 2011.

3.5.4 SIGNIFICANCE THRESHOLDS AND ANALYSIS METHODOLOGY

3.5.4.1 Significance Thresholds

NEPA does not specify significance thresholds that may be used to evaluate the effects of a proposed action on global climate. The appropriate approach to evaluating a project's impact on global climate under NEPA is still under development. In February 2010, the Council on Environmental Quality (CEQ) released draft NEPA guidance on the consideration of the effects of greenhouse gas emissions and climate change in NEPA documents. The CEQ guidance states that the "CEQ proposes to advise federal agencies to consider, in scoping their NEPA analysis, whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decision makers and the public. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public." The guidance further notes that "CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs."

The guidance recommends 25,000 $MTCO_2e$ of direct emissions[7] as a presumptive threshold for analysis and disclosure within NEPA documents. The guidance suggests that if a proposed action would result in direct emissions below this threshold, the emissions would not need to be discussed within a NEPA analysis. The guidance further notes that "When a proposed federal action meets an applicable threshold for quantification and reporting, CEQ proposes that the agency should also consider mitigation measures and reasonable alternatives to reduce action related GHG emissions." As the Proposed Action is expected to result in direct emissions that exceed 25,000 $MTCO_2e$ on an annual basis, the direct and indirect emissions associated with the Proposed Action are quantified and reported below and mitigation measures and reasonable alternatives are evaluated to reduce the GHG emissions.

The CEQ guidance also notes that land management techniques, including land use changes (such as those involved in the Proposed Action) lack any established federal protocol for assessing the effect of their GHG emissions at a landscape scale. In these instances, the guidance suggests that the federal agency should use NEPA's provisions for inter-agency consultation with available expertise to identify and follow the best available protocols for evaluating comparable activities. Consistent with this guidance, the USACE examined both State of California and local guidance and protocols related to the effects of GHG emissions to select a threshold of significance to use to evaluate the effect.

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7 The CEQ guidance does not define direct emissions. However, in commonly-used GHG accounting protocols such as the GHG Protocol from the World Resources Institute and the protocols developed by the California Climate Action Registry (now The Climate Registry), direct emissions are defined to include all sources that are within the organizational control of the property/facility owner, and often comprise sources such as on-site stationary sources, fleet, and fugitive and process emissions.

At the state level, CARB has not yet put forth significance thresholds for use to evaluate projects in California. However, CARB has commenced the implementation of a mandatory GHG reporting program that requires large industrial GHG emitters to report their GHG emissions. Large stationary combustion facilities that emit greater than or equal to 25,000 $MTCO_2e$ per year are subject to the reporting requirements. While CARB's reporting program and the CEQ's draft NEPA guidance do not provide significance thresholds, the 25,000 $MTCO_2e$ reporting threshold can be seen as a dividing line for major GHG emitters, which could have the potential to result in an adverse impact on the environment.

At the local level, as noted above, the PCAPCD has not adopted any numeric thresholds of significance for determining the significance of the effect of a project's GHG emissions. However, the PCAPCD has indicated that thresholds adopted by other air districts within California would be acceptable. The following four air districts have put forth thresholds of significance:

- The San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted the *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* (the California Environmental Quality Act) in late 2009. According to the guidance, the SJVAPCD recommends the use of best performance standards to assess the significance of GHG emissions. The SJVAPCD expects that compliance with the recommended best performance standards would reduce a project's GHG emissions by a target of 29 percent or more, compared to 'business as usual' (BAU) conditions. The 29 percent reduction target is based on the goal of AB 32, which is to reduce the state's GHG emissions to 1990 levels by 2020.
- The Sacramento Metropolitan Air Quality Management District (SMAQMD) has also adopted guidance recommending that a project achieve a 29 percent reduction from BAU conditions.
- The Bay Area Air Quality Management District (BAAQMD) has adopted thresholds[8] for both land use and stationary source projects. The land use threshold is further divided into three metrics: compliance with a qualified GHG Reduction Strategy; annual emissions less than 1,100 MTCO2e; or annual emissions less than 4.6 MTCO2e per service population (i.e., project residents plus employees). At present there are no qualified GHG reduction strategies applicable to the Proposed Action or alternatives. The 1,100 MTCO2e is intended for smaller projects with limited emissions, whereas the 4.6 MTCO2e per service person is an efficiency metric intended for large projects such as the Proposed Action.
- The South Coast Air Quality Management District (SCAQMD) recommends a tiered approach. The Tier 3 threshold requires that a project's incremental increase in GHG emissions should be below or mitigated to less than the significance screening level (10,000 $MTCO_2e$ per year for industrial projects; 3,500 $MTCO_2e$ for residential projects; 1,400 $MTCO_2e$ for commercial projects; 3,000 $MTCO_2e$ for mixed-use or all land use projects). The Tier 4 threshold requires that projects achieve a 29 percent reduction from a base case scenario, including land use sector reductions

8 The significance thresholds contained in the BAAQMD CEQA Guidelines were challenged by the CA Building Industry Association. On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds contained in the BAAQMD CEQA Guidelines. The court issued a writ of mandate ordering the District to set aside the thresholds and cease dissemination of them until the District had complied with CEQA. The BAAQMD accordingly is not recommending the use of the 2010 significance thresholds to determine the significance of air quality impacts. Instead, the BAAQMD recommends that the lead agency should "determine appropriate air quality thresholds of significance based on substantial evidence in the record."

from AB 32 (total emissions not to exceed 25,000 $MTCO_2e$) or achieve a project-level efficiency target of 4.8 $MTCO_2e$ per service population per year (total emissions not to exceed 25,000 $MTCO_2e$ per year). The proposed plan-level significance threshold is an efficiency target of 6.6 $MTCO_2e$ per service population per year by 2020.

None of the air districts provide a significance threshold for evaluating the effect of a project's construction-phase GHG emissions, but the BAAQMD guidance does state that "the Lead Agency should quantify and disclose GHG emissions that would occur during construction."

This EIS uses 25,000 $MTCO_2e$ of direct emissions as a threshold for evaluating the significance of the estimated emissions. The EIS also evaluates the Proposed Action and alternatives relative to their consistency with AB 32.

3.5.4.2 Analysis Methodology

The methodology used to estimate GHG emissions is summarized below.

The study used the URBEMIS2007 Environmental Management Software version 9.2.4 to estimate construction emissions and operational emissions from area and mobile sources associated with the Proposed Action. Default assumptions for construction equipment are included in the URBEMIS software, and were used for this study.

Mobile emissions during operation were estimated using default URBEMIS2007 values and trip generation rates provided by the traffic study. Emissions from area sources were also estimated using default URBEMIS2007 values. These emissions are primarily associated with combustion of natural gas and operation of landscape maintenance equipment.

The resulting URBEMIS files were then used as input for the BAAQMD's Greenhouse Gas Model (BGM). This model was developed by the BAAQMD to determine both direct and indirect GHG emissions using project-specific data developed in the URBEMIS model. Emissions from indirect sources include electricity use, water use, solid waste disposal, and wastewater treatment. Residential and commercial electricity use was estimated based on BGM default assumptions and provision of power by PG&E. Both water use and wastewater treatment produce emissions due to energy consumption during treatment and transport. Electricity use for both was based on reports to the CEC. Solid waste emissions were estimated based on methane generation at landfills from the decomposition of the waste. GHG emissions rates for solid waste are estimates developed by CARB for landfills in California.

As noted earlier, Clean Air legislation defines direct emissions as those emitted by sources that are within the organizational control of the property/facility owner. The GHG emissions that would be produced following the occupancy of the Proposed Action would not be under the organizational control of the USACE or the Applicants. Therefore, none of the emissions produced by the Proposed Action would be defined as direct emissions. However, for purposes of analysis, all GHG emissions generated by the homes and other land uses built on the site, such as area sources and mobile sources, are categorized as direct emissions or Scope 1 emissions. All other emissions such as those from generation of electricity, solid waste, etc., are categorized as indirect emissions or Scope 2 and 3 emissions.

3.5.5 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

Impact GHG-1 GHG Emissions due to Construction

No Action Alt., Proposed Action (Base Plan and Blueprint Scenarios), Alts. 1 through 5

Construction of the No Action Alternative, Proposed Action (Base Plan and Blueprint scenario), and Alternatives 1 through 5 (individually or combined) would result in one-time emissions of GHGs, which would be a **significant** effect. **PVSP EIR Mitigation Measures 4.8-1a** through **4.8-1e** would be implemented but the effect would remain **significant.**

The primary GHGs generated during construction are CO_2, CH_4, and nitrogen dioxide (N_2O). These emissions are the result of fuel combustion by construction equipment and motor vehicles. The other GHGs such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are typically associated with specific industrial sources and processes and would not be emitted during construction of the Proposed Action and alternatives.

Construction activities associated with the Proposed Action and alternatives would occur over a number of years, with portions of the area being developed in phases. However, the exact timing and duration of these phases is not currently known as they would be determined by market conditions and other factors that are unpredictable over the course of development. The estimated period in which build out of the Proposed Action (or any of the alternatives) would occur is from 2012 through 2030 or 2040. Depending on conditions, construction may be delayed or reduced so that the year of full build out could be well past that year.

The URBEMIS2007 Environmental Management Software was used to estimate the construction-related CO_2 emissions of the Proposed Action. The default construction equipment and vehicle mixes generated by URBEMIS2007 were assumed for grading and building construction. All construction was assumed to occur over the period of a single year, using the same general estimates of duration of construction phases that were used in preparation of the EIR. This provided a rough estimate of total GHG emissions from construction regardless of actual construction schedule. The total GHG emissions during construction would be approximately 29,000 MTCO2e for the Base Plan scenario and 40,000 MTCO2e for the Blueprint scenario. These values exceed the general major source threshold of 25,000 MTCO2e. Consequently, the effect from construction emissions would be **significant**.

Construction emissions are roughly proportional to the land area to be graded as well as the total building area. The URBEMIS model estimates construction emissions based on various parameters related to the amount of specific land use types to be constructed. Residential development emission estimates are based on number of dwelling units whereas retail and commercial development estimates are based on building square footage. The variation in these parameters between the No Action Alternative and the Proposed Action and Alternatives 1 through 5 is relatively small, especially in comparison

to the likely margin of error in the construction emissions estimate. Therefore, although the construction emissions were not estimated for any of the alternatives, they are expected to be similar to the estimated emissions of the Proposed Action, and none of the alternatives would result in emissions lower than the major source threshold of 25,000 $MTCO_2e$. Therefore, the effect from construction emissions under all alternatives would be **significant.**

PVSP EIR Mitigation Measures 4.8-1a through **4.8-1e** would be implemented to address the effect related to GHG emissions due to construction. These measures were adopted by Placer County at the time of the approval of PVSP (Base Plan) and will be enforced by the County. The USACE assumes that Placer County would impose the same mitigation measures on any development on the project site pursuant to Proposed Action Blueprint scenario, No Action Alternative, and Alternatives 1 through 5 (individually or combined) to address this impact. These measures would require a Placer County Air Pollution Control District (PCAPCD) approved construction emission/dust control plan and compliance with the construction vehicle air pollutant control strategies developed by the PCAPCD. The EIR states that these mitigation measures would significantly reduce construction-related GHG impacts but not fully mitigate the effect which would remain significant and unavoidable. The USACE also finds that the mitigation measures described above would not fully mitigate the effect of the Proposed Action and all alternatives, and this effect would remain **significant**.

PVSP EIR Mitigation Measure 4.8-1a through
PVSP EIR Mitigation Measure 4.8-1e: **Minimize GHG Emissions during Construction *(Applicability – Proposed Action and All Alternatives)***

Would require a PCAPCD-approved construction emission/dust control plan and compliance with the construction vehicle air pollutant control strategies developed by the PCAPCD. The full text of the mitigation measures is available in ***Appendix 3.0****.*

Impact GHG-2 GHG Emissions due to Operation/Occupancy

No Action Alt., Proposed Action (Base Plan and Blueprint Scenarios), Alts. 1 through 5

The GHG emissions due to operation/occupancy from the No Action Alternative, Proposed Action, and Alternatives 1 through 5 would result in a **significant** effect. **PVSP EIR Mitigation Measures 4.13-1a** through **4.13-1p** would reduce the effect but the effect would remain **significant.**

Upon occupancy, the Proposed Action would generate GHG emissions - primarily CO_2, CH_4, and N_2O - from a number of sources that include (1) area sources (natural gas consumption), (2) motor vehicles, (3) indirect sources (electricity consumption, water, and wastewater), and (4) stationary sources. **Table 3.5-4, Estimated Operational GHG Emissions – Proposed Action,** presents the total estimated GHG emissions from occupancy and operation of the Proposed Action. Changes in carbon sequestration (the storage of carbon in biomass) from the Proposed Action are assumed to be negligible as the site is primarily grassland, with no significant sources of carbon sequestration. The Proposed Action's direct (Scope 1) emissions would exceed 25,000 $MTCO_2e$.

Table 3.5-4 also presents the indirect emissions that would be produced as a result of the occupancy of the Proposed Action. As the table shows, the Proposed Action's total emissions (Scope 1, 2, and 3) would exceed 25,000 $MTCO_2e$.

Table 3.5-4
Estimated Operational GHG Emissions – Proposed Action

Scope	GHG Emissions Source	Emissions (Metric Tons CO_2e/year)	
		Base Plan	Blueprint
Scope 1	Transportation (Mobile Sources)	279,851	342,069
	Area Sources	45,365	63,802
Scope 2	Electricity	49,046	60,945
Scope 3	Solid Waste	33,043	39,489
	Water & Wastewater	2,604	3,565
Total Scope 1/Direct Emissions		**325,216**	**405,871**
CEQ Threshold for Analysis		**25,000**	**25,000**
Exceeds Threshold?		YES	YES
Total Operational GHG Emissions		**409,771**	**509,666**

*Source: Impact Sciences, Inc. Emissions calculations are provided in **Appendix 3.5**.*

The basis for GHG emissions thresholds in California is AB 32, which requires a general state-wide reduction in emissions of 29 percent from BAU. The operational emissions shown in **Table 3.5-4** do not include any GHG reductions or other efficiency or sustainability measures and would therefore be considered BAU. Given the magnitude of these emissions and the fact that they result from BAU, the Proposed Action's effect on global climate would be **significant.**

Emissions from both area and mobile sources are generally proportional to the level of

development, specifically the number of residential units to be constructed and the total amount of commercial or other building space to be built on the site. While the No Action Alternative would reduce the overall development footprint and the size of the proposed community, Alternatives 1 through 5 primarily vary in the acreage committed to residential, public, commercial and other land uses, while holding the actual amount of both residential units and commercial space to be developed constant. Consequently, emissions from the various alternatives would be very similar to those of the Proposed Action. While increased density would result in some minor reductions in emissions from vehicles, the reductions would not significantly change the total emission estimates. Therefore, all alternatives would result in GHG emissions that would be substantially over the threshold suggested by CEQ and because they would be BAU emissions, the emissions from the operation of all alternatives would result in a **significant** effect on global climate.

PVSP EIR Mitigation Measures 4.13-1a through **4.13-1p** would be implemented to address the effect from GHG emissions due to operation and occupancy. These mitigation measures were adopted by Placer County at the time that it approved PVSP (Base Plan) and will be enforced by the County. The USACE assumes that Placer County would impose the same mitigation measures on any development on the project site pursuant to Proposed Action (Blueprint Scenario), No Action Alternative, and Alternatives 1 through 5 (individually or combined) to address this impact. These measures would require the implementation of a variety of methods to reduce GHG emissions, such as promoting bicycle and transit use, prioritizing electric, hybrid or alternative fuel vehicles as well as ride sharing. Other methods include implementing measures to reduce residential energy consumption and requiring waste diversion and recycling. Placer County concluded that these mitigation measures would significantly reduce operational GHG impacts but not fully mitigate the effect, which would remain significant and unavoidable (Placer County 2007). The USACE also finds that the mitigation measures described above would not fully mitigate the effect of the Proposed Action and all alternatives, and this effect would remain **significant** after mitigation.

PVSP EIR Mitigation Measure 4.13-1a through
PVSP EIR Mitigation Measure 4.13-1p: **Minimize GHG Emissions during Operation/Occupancy (*Applicability – Proposed Action and Alternatives*)**

Would require a variety of methods to reduce GHG emissions, such as promoting bicycle and transit use, prioritizing electric, hybrid or alternative fuel vehicles as well as ride sharing. Other methods include implementing measures to reduce residential energy consumption and requiring waste diversion and recycling. The full text of the mitigation measure is available in ***Appendix 3.0****.*

Impact GHG-3 Indirect Effects on Climate Change from Off-Site Infrastructure Not Constructed as Part of the Project

No Action Alt., Proposed Action (Base Plan and Blueprint Scenarios), and Alts. 1 through 5

The construction of off-site water pipeline infrastructure by the Placer County Water Agency (PCWA) which may be used by the No Action Alternative, Proposed Action, and Alternatives 1 through 5, would likely result in **less than significant** effects to climate change. The duration and extent of construction is unknown. However because construction emissions would be short term and very small compared to the operational emissions of any development project or the construction emissions of the Proposed Action, and mitigation measures that are routinely implemented to reduce criteria pollutant emissions from construction equipment, would also reduce GHG emissions, the impact from construction emissions associated with pipeline infrastructure would be less than significant. There would be no operational air quality emissions related to maintenance of the off-site water pipelines.

3.5.6 RESIDUAL SIGNIFICANT IMPACTS

PVSP EIR Mitigation Measures 4.8-1a through **4.8-1e** would reduce construction-phase GHG emissions, but would be insufficient to reduce the emissions significantly. The Proposed Action and the alternatives would have a residual **significant** effect due to GHG emissions during construction.

PVSP EIR Mitigation Measures 4.13-1a through **4.13-1p** would reduce emissions, but would be insufficient to reduce the emissions significantly. The Proposed Action and the alternatives would have a residual **significant** effect due to GHG emissions during operation and occupancy.

3.5.7 REFERENCES

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