

4.16 GLOBAL CLIMATE CHANGE

This section provides a discussion of the existing climate and an analysis of potential changes to the climate from implementation of the proposed project. This section summarizes information provided in the *Air Quality Assessment Report* (LSA Associates, Inc., October 2010). The *Air Quality Assessment Report* is included in Appendix C of this Environmental Impact Report (EIR).

4.16.1 Existing Environmental Setting

The project site is located in Orange County, which is part of the South Coast Air Basin (SCAB) and is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

4.16.1.1 Description of Global Climate Change and Its Sources

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or wind) that last for an extended period of time. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures.

Climate change refers to any change in measures of weather (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from natural factors, such as changes in the sun's intensity; natural processes within the climate system, such as changes in ocean circulation; or human activities, such as the burning of fossil fuels, land clearing, or agriculture. The primary observed effect of global climate change has been a rise in the average global tropospheric¹ temperature of 0.36 degrees Fahrenheit (°F) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include higher sea levels, drier or wetter weather, changes in ocean salinity, changes in wind patterns, or more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and increased intensity of tropical cyclones. Specific effects in California might include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion in the Sacramento/San Joaquin Delta.

Global surface temperatures rose by 1.33°F ±0.32°F over the 100-year period from 1906 to 2005. The rate of warming over the last 50 years is almost double that over the last 100 years.² The latest projections, based on state-of-the-art climate models, indicate that temperatures in California are expected to rise 3–10.5°F by the end of the century.³ The prevailing scientific opinion on climate change is that "most of the warming observed over the last 50 years is attributable to human

¹ The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

² Intergovernmental Panel on Climate Change (IPCC), 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC*.

³ California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California*. July.

activities.”¹ Increased amounts of carbon dioxide (CO₂) and other greenhouse gases (GHGs) are the primary causes of the human-induced component of warming. The observed warming effect associated with the presence of GHGs in the atmosphere (from either natural or human sources) is often referred to as the greenhouse effect.²

GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:³

- CO₂
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF₆)

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere and enhancing the natural greenhouse effect, which is believed to be causing global warming. While GHGs produced by human activities include naturally occurring GHGs such as CO₂, CH₄, and N₂O, some gases, like HFCs, PFCs, and SF₆, are completely new to the atmosphere. Certain other gases, such as water vapor, are short-lived in the atmosphere as compared to these GHGs that remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is generally excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this EIR, the term “GHGs” will refer collectively to the six gases identified in the bulleted list provided above.

These gases vary considerably in terms of their Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere (“atmospheric lifetime”). The GWP of each gas is measured relative to CO₂, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO₂ over a specified time period. GHG emissions are typically

¹ Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis*, <http://www.ipcc.ch>.

² The temperature on Earth is regulated by a system commonly known as the “greenhouse effect.” Just as the glass in a greenhouse allows heat from sunlight in and reduces the amount of heat that escapes, greenhouse gases like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of greenhouse gas results in global warming, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

³ The greenhouse gases listed are consistent with the definition in Assembly Bill (AB) 32 (Government Code 38505), as discussed later in this section.

measured in terms of metric tons¹ of “CO₂ equivalents” (CO₂e). Table 4.16.1 shows the GWPs for each type of GHG. For example, sulfur hexafluoride is 22,800 times more potent at contributing to global warming than carbon dioxide.

Table 4.16.1: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide (CO ₂)	50–200	1
Methane (CH ₄)	12	25
Nitrous Oxide (NO _x)	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF ₄)	50,000	7,390
PFC: Hexafluoromethane (C ₂ F ₆)	10,000	12,200
Sulfur Hexafluoride (SF ₆)	3,200	22,800

Source: Intergovernmental Panel on Climate Change, 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

HFC = hydrofluorocarbon

IPCC = Intergovernmental Panel on Climate Change

PFC = perfluorocarbon

The following discussion summarizes the characteristics of the six primary GHGs.

Carbon Dioxide. In the atmosphere, carbon generally exists in its oxidized form, as CO₂. Natural sources of CO₂ include the respiration (breathing) of humans, animals and plants, volcanic outgassing, decomposition of organic matter, and evaporation from the oceans. Human-caused sources of CO₂ include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. The Earth maintains a natural carbon balance, and when concentrations of CO₂ are upset, the system gradually returns to its natural state through natural processes. Natural changes to the carbon cycle work slowly, especially compared to the rapid rate at which humans are adding CO₂ to the atmosphere. Natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of human-made CO₂, and consequently the gas is building up in the atmosphere. The concentration of CO₂ in the atmosphere has risen approximately 30 percent since the late 1800s.²

In 2002, CO₂ emissions from fossil fuel combustion accounted for approximately 98 percent of human-made CO₂ emissions and approximately 84 percent of California’s overall GHG emissions (CO₂e). The transportation sector accounted for California’s largest portion of CO₂ emissions, with gasoline consumption making up the greatest portion of these emissions. Electricity generation was California’s second-largest category of GHG emissions.

¹ A metric ton is equivalent to approximately 1.1 tons.

² California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

Methane. CH₄ is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (burning of coal, oil, natural gas, etc.). Decomposition occurring in landfills accounts for the majority of human-generated CH₄ emissions in California, followed by enteric fermentation (emissions from the digestive processes of livestock).¹ Agricultural processes such as manure management and rice cultivation are also significant sources of human-made CH₄ in California. CH₄ accounted for approximately 6 percent of gross climate change emissions (CO₂e) in California in 2002.² It is estimated that over 60 percent of global methane emissions are related to human-related activities.³ As with CO₂, the major removal process of atmospheric CH₄—a chemical breakdown in the atmosphere—cannot keep pace with source emissions, and CH₄ concentrations in the atmosphere are increasing.

Nitrous Oxide. N₂O is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. N₂O is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N₂O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N₂O emissions in California. N₂O emissions accounted for nearly 7 percent of human-made GHG emissions (CO₂e) in California in 2002.

Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride. HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.⁴ PFCs and SF₆ are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry, which is active in California, leads to greater use of PFCs. HFCs, PFCs, and SF₆ accounted for about 3.5 percent of human-made GHG emissions (CO₂e) in California in 2002.⁵

4.16.1.2 Emissions Sources and Inventories.

An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes

¹ California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. <http://www.arb.ca.gov/cc/inventory/data/data.htm>. Accessed November 2008.

² Ibid.

³ IPCC, 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

⁴ The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

⁵ California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

the latest information on global, national, California, and local GHG emission inventories. However, because GHGs persist for a long time in the atmosphere (see Table 4.16.1), accumulate over time, and are generally well-mixed, their impact on the atmosphere and climate cannot be tied to a specific point of emission.

Global Emissions. Worldwide emissions of GHGs in 2004 were 27 billion metric tons of CO₂e per year.¹ Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC).

United States Emissions. In 2008, the United States emitted approximately 7.0 billion metric tons of CO₂e, or approximately 25 tons per year per person. Of the six major sectors nationwide—electric power industry, transportation, industry, agriculture, commercial, residential—the electric power industry and transportation sectors combined account for approximately 62 percent of the GHG emissions. The majority of the electrical power industry and all of the transportation emissions are generated from direct fossil fuel combustion. Between 1990 and 2006, total United States GHG emissions rose approximately 14.7 percent.²

State of California Emissions. According to California Air Resources Board (ARB) emission inventory estimates, California emitted approximately 480 million metric tons of CO₂e (MMTCO₂e) emissions in 2004.³ This large number is due primarily to the sheer size of California compared to other states. By contrast, California has the fourth-lowest per capita CO₂ emission rate from fossil fuel combustion in the country, due to the success of its energy efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise.⁴

The California Environmental Protection Agency (Cal/EPA) Climate Action Team stated in its March 2006 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO₂e) was as follows:

- CO₂ accounted for 83.3 percent
- CH₄ accounted for 6.4 percent
- N₂O accounted for 6.8 percent

¹ Combined total of Annex I and Non-Annex I Country CO₂eq emissions. United Nations Framework Convention on Climate Change (UNFCCC), 2007. *Greenhouse Gas Inventory Data*. Information available at http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php and http://maindb.unfccc.int/library/view_pdf.pl?url=http://unfccc.int/resource/docs/2005/sbi/eng/18a02.pdf.

² U.S. Environmental Protection Agency (EPA). 2010. The 2010 U.S. Greenhouse Gas Inventory Report. <http://www.epa.gov/climatechange/emissions/usinventoryreport.html>. Accessed September 2010.

³ California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. <http://www.arb.ca.gov/cc/inventory/data/data.htm>. Accessed November 2008.

⁴ California Energy Commission (CEC), 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 - Final Staff Report, publication # CEC-600-2006-013-SF, Sacramento, CA, December 22, 2006; and January 23, 2007 update to that report.

- HFCs, PFCs, and SF₆ accounted for 3.5 percent¹

The California ARB estimates that transportation is the source of approximately 38 percent of the State's GHG emissions in 2004, followed by electricity generation (both in-State and out-of-State) at 23 percent, and industrial sources at 20 percent. The remaining sources of GHG emissions are residential and commercial activities at 9 percent, agriculture at 6 percent, high global warming potential gases at 3 percent, and recycling and waste at 1 percent.²

The California ARB is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State of California and supports the AB 32 Climate Change Program. The California ARB's current GHG emission inventory covers the years 1990–2004 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, agricultural lands). The emission inventory estimates are based on the actual amount of all fuels combusted in the State, which accounts for over 85 percent of the GHG emissions within California.

The California ARB staff has projected statewide unregulated GHG emissions for 2020, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions, will be 596 MMTCO_{2e}. GHG emissions from the transportation and electricity sectors as a whole are expected to increase, but remain at approximately 38 percent and 23 percent of total CO_{2e} emissions, respectively. The industrial sector consists of large stationary sources of GHG emissions, and the percentage of the total 2020 emissions is projected to be 17 percent of total CO_{2e} emissions. The remaining sources of GHG emissions in 2020 are high global warming potential gases at 8 percent, residential and commercial activities at 8 percent, agriculture at 5 percent, and recycling and waste at 1 percent.³

4.16.2 Regulatory Setting

4.16.2.1 Federal Regulations

Kyoto Protocol. The United States participates in the UNFCCC (signed on March 21, 1994). The Kyoto Protocol is a treaty reached under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008 to 2012. Although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol, and the United States is not bound by the Protocol's commitments.

The goal of the Protocol is to achieve overall emissions reduction targets for six GHGs by the period of 2008 to 2012. The six GHGs regulated under the Protocol are CO₂, CH₄, N₂O, SF₆, HFCs, and PFCs. Each nation has an emissions reduction target to reduce GHG emissions a certain percentage below 1990 levels (e.g., 8 percent reduction for the European Union, 6 percent reduction for Japan).

¹ California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

² California Air Resources Board, 2008. <http://www.climatechange.ca.gov/inventory/index.html>. September.

³ Ibid.

The average reduction target for nations participating in the Kyoto Protocol is approximately 5 percent below 1990 levels. Many subsequent measures are tied to these Kyoto Protocol commitments.

United States Climate Policy and Actions. The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. In February 2002, the United States government announced a comprehensive strategy to reduce the GHG intensity of the United States economy by 18 percent over the 10-year period from 2002 to 2012. GHG intensity measures the ratio of GHG emissions to economic output.

The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate CO₂ emissions under the Clean Air Act (CAA). While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 that are required to implement a regulatory approach to global climate change.

On September 30, 2009, the EPA announced a proposal that focuses on large facilities emitting over 25,000 tons of GHG emissions per year. These facilities would be required to obtain permits that would demonstrate they are using the best practices and technologies to minimize GHG emissions.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆) constitute a threat to public health and welfare and that the combined emissions from motor vehicles cause and contribute to global climate change. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule 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. EPA is finalizing the first-ever national GHG emissions standards under the CAA, and NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. The EPA GHG standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO₂ per mile in model year 2016, equivalent to 35.5 miles per gallon (mpg).

4.16.2.2 State Regulations

Assembly Bill 1493 Vehicular Emissions of Greenhouse Gases. In a response to the transportation sector's significant contribution to California's CO₂ emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493, the *New Passenger Motor Vehicle Greenhouse Gas Emission Standards* legislation, amended Section 42823 and added Section 43018.5 to the California Health and Safety Code (Division 26, Part 5, Chapter 1) (added by Statutes in 2002, Chapter 200, Section 3). Section 43018.5 requires ARB to set GHG emission standards for passenger vehicles and light-duty trucks (and other vehicles whose primary use is noncommercial personal transportation in the State) manufactured in 2009 and all subsequent model years. In setting these standards, ARB considered cost effectiveness, technological feasibility, and economic impacts. ARB adopted the

standards in September 2004. When fully phased in, the near-term (through 2012) standards would result in a reduction in GHG emissions of approximately 22 percent compared to the emissions from the 2002 fleet, while the midterm (2013 to 2016) standards would result in a reduction of approximately 30 percent. To set its own GHG emissions limits on motor vehicles, California must receive a waiver from the EPA. However, in December 2007, the EPA denied the request from California for the waiver. In January 2008, the California Attorney General filed a petition for review of the EPA's decision in the Ninth Circuit Court of Appeals. On January 26, 2009, the President issued an Executive Memorandum directing the EPA to reassess its decision to deny the waiver and to initiate any appropriate action.¹ On May 18, 2009, the President announced the enactment of a 35.5 miles-per-gallon (mpg) fuel economy standard for automobiles and light-duty trucks that will begin to take effect in 2012. This standard is approximately the same standard that was proposed by California; therefore, the California waiver request was shelved.

Executive Order S-03-05. In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order (EO) S-3-05. The EO established the following goals: GHG emissions should be reduced to 2000 levels by 2010; to 1990 levels by 2020; and to 80 percent below 1990 levels by 2050. Furthermore, EO S-03-05 requires the Secretary of the California Environmental Protection Agency (Cal EPA) to evaluate the impacts of climate change and establish mitigation measures that would reduce potential impacts. EO S-03-05 is also known as the *Greenhouse Gas (GHG) Emission Reduction Targets for California Executive Order*.

Assembly Bill 32 – California Global Warming Solutions Act of 2006. California's major initiatives for reducing GHG emissions are outlined in AB 32, the "Global Warming Solutions Act," passed by the California State legislature on August 31, 2006, and codified in Section 38500 et seq. of the California Health and Safety Code (HSC) (Division 25.5, Part 1 through Part 7) (added by Statutes in 2006, Chapter 488); the 2005 EO discussed above; and a 2004 ARB regulation to reduce passenger car GHG emissions. The statute begins with several legislative findings and declarations of intent, including the following:

"Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snow pack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems."
(Health and Safety Code, Section 38501)

The State goal is to reduce GHG emissions to 1990 levels by 2020, a reduction of approximately 25 percent, followed by an 80 percent reduction below 1990 levels by 2050. The main strategies for making these reductions are outlined in the Scoping Plan, which, when completed, will include a range of GHG reduction actions that can include direct regulations, alternative compliance

¹ Obama, President Barack. 2009. Memorandum for the Administrator of the Environmental Protection Agency. State of California Request for Waiver Under 42 United States Code (U.S.C.) 7543(b), the Clean Air Act. January 26.

mechanisms, monetary and nonmonetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

Pursuant to the requirements of HSC Section 38500 et seq., the State's reduction in global warming emissions will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012. Additional early action items include a comprehensive framework of regulatory and nonregulatory elements that will result in significant and effective GHG emission reductions. Subsequent to approval of the early action measures, ARB developed a Climate Change Scoping Plan to lower the State's GHG emissions to meet the HSC Section 38500 et seq. 2020 limit that was approved in December 2008. In addition, AB 32 created the Climate Action Team (CAT), a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of ARB's jurisdiction.

HSC Section 38562 requires ARB to adopt GHG emission limits and emission reduction measures by January 1, 2011, both of which are to become effective on January 1, 2012. ARB must also evaluate whether to establish a market-based cap and trade system. HSC Section 38500 et seq. does not identify a significance level of GHG for California Environmental Quality Act (CEQA) purposes, and ARB has adopted such significance threshold.

ARB 2007 Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California. ARB, pursuant to the requirements of HSC Section 38500 et seq., has directed its staff to pursue and adopt so-called early action measures that would help the State in achieving its 2020 GHG reduction goals. The *Early Action Measures to Reduce Greenhouse Gas Emissions in California* report, published in 2007, adopted the first 37 measures. Based on additional meetings with stakeholders that included SCAQMD, ARB, and the California Air Pollution Control Officers Association (CAPCOA), existing measures were revised and new action measures were proposed. To report the findings, an *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions* report was published later the same year. In the report ARB recommends expansion of the adopted 37 strategies to a total of 44 measures. The broad spectrum of strategies includes a Low Carbon Fuel Standard (LCFS), regulations for refrigerants with high GWPs, guidance and protocols for local governments to facilitate GHG reductions, and green ports. The report describes each measure and either recommends its approval or reclassification, or reports on the input received from the stakeholders group. The report analyzes the potential emissions reductions achieved from each measure, estimates the cost of the implementation, and analyzes the measure's feasibility.

Executive Order S-01-07. EO S-01-07 was put forth by Governor Schwarzenegger on January 18, 2007. California further solidified its dedication to reducing GHGs above what was intended in EO S-03-05 by setting a new LCFS for transportation fuels sold within the State. EO S-1-07 sets a declining standard for GHG emissions measured in carbon dioxide equivalent (CO₂e) grams per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. Essentially, the order mandates the following: (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and (2) that an LCFS for transportation fuels be established for California. The Executive Order is also known as the *Low Carbon Standard for Transportation Fuels*.

Senate Bill 97, Companion Bill to Global Warming Solutions Act. To address GHG emissions and global climate change in General Plans and CEQA documents, Senate Bill (SB) 97 (by Statutes in 2007, Chapter 185) added Section 21083.05 and added and repealed Section 21097 of the California Public Resources Code (Division 13, Chapter 2.6) (added by Statutes in 2007, Chapter 185). Section 21083.05 requires the Office of Planning and Research (OPR) to develop CEQA Guidelines on how to address global warming emissions and mitigate project-specific GHGs. OPR adopted amendments to the CEQA Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the amendments and filed them with the Secretary of State for inclusion in the California Code of Regulations. The amendments became effective on March 18, 2010. These CEQA Guideline amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents.

California's Sustainable Communities Planning Act (Senate Bill 375). SB 375, which was signed into law on October 1, 2008,¹ provides emissions reduction goals and incentives for local governments and developers to follow new conscientiously planned growth patterns in order to reduce GHG emissions. Section 65080(F)(2)(A) enhances ARB's ability to reach AB 32 goals by directing ARB to develop regional GHG emissions reduction targets to be achieved by the automobile and light-truck sectors for 2020 and 2035. ARB will also work with California's 18 Metropolitan Planning Organizations (MPOs) to align their regional transportation, housing, and land use plans; prepare a "sustainable communities strategy" to reduce the number of vehicle miles traveled (VMT) in their respective regions; and demonstrate the region's ability to attain its GHG reduction targets.

Waste Diversion. AB 75² was passed in 1999, and the State Agency Model Integrated Waste Management Act (IWMA) (Chapter 764, Statutes of 1999, Strom-Martin) took effect on January 1, 2000. This bill added new provisions, Sections 40148, 40196.3, and 41821.2, and Chapter 18.5 (commencing with Section 42920) to Part 3 of Division 30 to the Public Resources Code (PRC) mandating that State agencies develop and implement an Integrated Waste Management Plan (IWMP); AB 75 also mandated that community service districts provide solid waste services report disposal and diversion information to the city, county, or regional agency in which the community service district is located. Among other things, established the requirement for community service districts to divert at least 25 percent of their solid waste from landfills or transformation facilities by January 1, 2002, and divert 50 percent on and after January 1, 2004. The Per Capita Disposal Measurement System Act (SB 1016) was passed in 2008 and codified in the California Public Resources Code.³ Sections 42920–42921.5 changed the way State agencies and local governments

¹ SB 375 was codified to amend Sections 65080, 65583, 65584.01, 65584.02, 65584.04, 65587, and 65588, (Title 7, Division 1, Chapter 2.5), and it added Sections 14522.1, 14522.2, and 65080.01 (Title 2, Division 3, Part 5.3 Chapter 2) to the California Government Code and amended Section 21061.3 and added Section 21159.28 and Chapter 4.2 (commencing with Section 21155) to Division 13 of the California Public Resources Code (added by Statutes in 2008, Chapter 728).

² AB 75 repealed Sections 42922, 42923, 42927, and 42928 of the Public Resources Code, related to recycling.

³ SB 1016 amended Sections 40183, 40184, 41783, 41820.6, 41821) 41850, 42921, and 42926; amended the headings of Article 4 (commencing with Section 41825) and Article 5 (commencing with Section 41850) of

measure their progress toward meeting the statutory waste diversion mandates. Under this Act, State agencies are still required to maintain the 50 percent waste diversion requirement mandated by the State agency IWMA. However, with the passage of the Per Capita Disposal Measurement System Act, State agencies and large State facilities use per capita disposal as an indicator of their progress toward meeting the mandate.

4.16.3 Methodology

4.16.3.1 Global Climate Change

For this analysis of GHG emissions during construction and operation of the proposed project, only CO₂, CH₄, and N₂O have been considered. This is due to the relatively large contribution of these gases in comparison to other GHGs produced during the project construction and operation phases.

The GHG emissions estimates were calculated using the ARB URBEMIS 2007 computer model. URBEMIS stands for "Urban Emissions," and URBEMIS 2007 is an air quality modeling program that estimates air pollution emissions in pounds per day (lbs/day) or tons per year (tpy) for various land uses, area sources, construction projects, and project operations. Mitigation measures can also be specified to analyze the effects of mitigation on project emissions. The URBEMIS 2007 model uses the ARB EMFAC2007 model for on-road vehicle emissions and the OFFROAD2007 model for off-road vehicle emissions. The only GHG URBEMIS 2007 analyzes is CO₂. The CO₂ calculations were then used to calculate CH₄ and N₂O.

4.16.4 Thresholds of Significance

The impact significance criteria used for this analysis are based primarily on Appendix G of the CEQA Guidelines and the County of Orange *Local CEQA Procedures Manual* (2000). The project may be considered to have a significant effect related to climate change if implementation would result in one or more of the following:

- Threshold 4.16.1:** Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- Threshold 4.16.2:** Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

4.16.5 Impacts and Mitigation

4.16.5.1 Less Than Significant Impacts

- Threshold 4.16.1:** Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

Division 30, Part 2, Chapter 7; added Sections 40127, 40145, 40150.1, 41780.05, 42921.5, 42927; and repealed and added Section 41825 of the California Public Resources Code (added by Statutes in 2008, Chapter 343).

Construction Emissions. Construction activities produce combustion emissions from various sources, such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, asphalt paving, and motor vehicles transporting the construction crew. This project construction includes the on-site relocation of approximately 9 million cubic yards of earth using 20 cubic-yard capacity haul trucks. This relocation process will occur throughout a 2-year period. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change. Most of the equipment and vehicle engines require the combustion of fuel. The combustion of fossil-based fuels creates GHGs such as CO₂, CH₄, and N₂O. Furthermore, CH₄ is emitted during the fueling of heavy equipment. Short-term GHG emissions would occur from construction activities, consisting primarily of emissions from equipment exhaust.

The only GHG with well-studied emissions characteristics and published emissions factors for construction equipment is CO₂. As shown in Table 4.16.2, construction of the proposed project would generate up to 29,982 lbs/day of CO₂ during the grading/excavation phase. Construction of the proposed project would generate a total of 6,943 tons of CO₂ during the 30-month construction schedule. However, as discussed below, the proposed project would reduce the long-term regional CO₂ emissions by 28,012 lbs/day (14 tons/day) in 2016. The project would be required to implement the construction exhaust control measures listed in Section 4.3, Air Quality, as Mitigation Measures 4.3-3 and 4.3-4, including minimization of construction equipment idling and implementation of proper engine tuning and exhaust controls. These measures would reduce GHG emissions during the construction period. In addition, the operational benefit of the proposed project would offset the construction emissions within approximately 500 days of opening, which is less than 2 years. *Therefore, with the implementation of Mitigation Measures 4.3-3 and 4.3-4, construction of the proposed project would not contribute significantly to global warming and impacts are considered less than significant.*

Table 4.16.2: Peak-Day Construction Emissions (lbs/day) by Phase

Construction Phase ¹	CO ₂
Grubbing/Land Clearing	10,558.8
Grading/Excavation	29,982.0
Drainage/Utilities/Subgrade	6,909.5
Paving	4,595.9
SCAQMD Emissions Threshold	–
Exceed Significance?	N/A

Source: *Air Quality Assessment Report*, LSA Associates, Inc. (October 2010).

¹ It is assumed that there is no overlap of these construction phases.

CO₂ = carbon dioxide

lbs/day = pounds per day

N/A = not applicable

SCAQMD = South Coast Air Quality Management District

Operational Emissions. The proposed project would not generate new vehicular traffic trips since it would not construct new homes or businesses. However, there is a possibility that some traffic currently utilizing other routes would be attracted to use the new facility, thus resulting in a change in regional VMT. The impact of the proposed project on GHG emissions was calculated using traffic data for the Orange County region.

As shown in Table 4.16.3, the proposed project would result in a decrease in VMT and vehicle hours traveled (VHT) in 2016 and 2035. As shown in Table 4.16.4, this decrease in VMT and VHT would reduce the CO₂ emissions within the region. *Therefore, the operation of the proposed project would not contribute significantly to global warming, and no mitigation is required.*

Table 4.16.3: Change in Regional VMT and VHT

Year	Regional VMT	Regional VHT
Existing	7,045,375	146,012
2016 No Build	8,612,151	183,467
2016 Build	8,581,393	183,038
2035 No Build	10,689,041	233,117
2035 Build	10,617,510	232,120

Source: *Air Quality Assessment Report*, LSA Associates, Inc. (October 2010).

VHT = vehicle hours traveled
VMT = vehicle miles traveled

Table 4.16.4: Change in Regional CO₂ Emissions

Alternative	Daily CO ₂ Emissions (lbs/day)	Increase from No Build (lbs/day)	Percent Increase from No Build
Existing	6,103,817	–	–
2016 No Build	7,531,152	–	–
2016 Build	7,503,140	-28,012	-0.4%
2035 No Build	9,483,881	–	–
2035 Build	9,420,415	-63,466	-0.7%

Source: *Air Quality Assessment Report*, LSA Associates, Inc. (October 2010).

CO₂ = carbon dioxide
lbs/day = pounds per day

Threshold 4.16.2: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The County of Orange has not yet adopted a Climate Action Plan or similar greenhouse gas reduction plan or strategy, and the Orange County Council of Governments has not yet adopted a Sustainable Communities Strategy. The proposed project is consistent with the intent of SB 375, however, which promotes alignment of transportation, housing, and land use plans to reduce GHG emissions. Avenida La Pata/La Pata Avenue and Camino Del Rio have been shown on the Orange County Master Plan of Arterial Highways (MPAH) in various configurations since 1963 and in their current approximate alignment since 1981. In addition, Avenida La Pata/La Pata Avenue and Camino Del Rio have been shown on the San Clemente General Plan Circulation Plan since 1982. The proposed project is consistent with the County MPAH and Transportation Element/Circulation Plan. The County’s Land Use Element and Transportation Element/Circulation Plan are integrated components of the County’s General Plan. The existing Forster Ranch development, Talega development, Prima Deshecha Landfill facility and approved Rancho Mission Viejo Ranch Plan reflect past planning efforts by the County. All four developments include the proposed project and reserve or identify right-of-way for

implementation of the proposed project. Therefore, the proposed project implements a circulation plan that supports the County's land use plan. The proposed project improvements serve existing uses and would be sized to accommodate the planned traffic volumes associated with build out of approved General Plans and Specific Plans in the City of San Clemente, the City of San Juan Capistrano, and unincorporated areas of Orange County.

Furthermore, the proposed gap closure of Avenida La Pata/La Pata Avenue would provide a parallel roadway to Interstate 5 (I-5) in southern Orange County and would support reduced VMT and VHT in southern Orange County, resulting in a reduction in GHG emissions compared to a future scenario without the proposed gap closure. *Therefore, the proposed project represents the alignment of transportation, housing, and land use plans would reduce GHG emissions; and is consistent with the intent of SB 375. The project would have a less than significant impact, and no mitigation is required.*

4.16.6 Cumulative Impacts

The cumulative study area for consideration of impacts related to global climate change is the State of California. As described above, the statewide inventory of CO₂e emissions for 1990 was 427 MMTCO₂e, and, for 2020, is expected to be 600 MMTCO₂e under a business-as-usual (BAU) scenario. Interpolation of an inventory for 2012 (the year most of the AB 32 control measures are anticipated to go into effect) results in approximately 554 MMTCO₂e BAU. As shown in Table 4.16.4, the proposed project will result in a reduction of 28,012 lbs/day in 2016, which represents a very small percent of the statewide GHG total in 2012. Implementation of the project would not result in GHG emission levels that would substantially conflict with implementation of the GHG reduction goals and, in fact, would reduce GHG emissions slightly due to the reduction in VHT as a result of the gap closure. Project-related GHG emissions and their contribution to global climate change impacts in the State are less than significant and less than cumulatively considerable because the project: (1) would be substantially consistent with policies and standards set out in federal, State, and local plans designed to GHG emissions; and (2) would result in a reduction in CO₂e emissions. No mitigation is required.

4.16.7 Level of Significance after Mitigation

Emissions of GHGs during construction will be offset by the operational benefits within 2 years of project opening. With the implementation of Mitigation Measures 4.3-3 and 4.3-4, the global climate impacts of the project are considered to be less than significant.