K. GLOBAL CLIMATE CHANGE

Increasing public awareness and general scientific consensus that global climate change is occurring have placed a new focus on the California Environmental Quality Act (CEQA) as a potential means to address a project's greenhouse gas (GHG) emissions. CEQA requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects considered for approval. According to a recent letter from California's Office of the Attorney General [1] and other State guidance, global climate change can be considered an "effect on the environment" and an individual project's incremental contribution to global climate change can have a cumulatively considerable impact.

Land use projects may contribute to the phenomenon of global climate change in ways that would be experienced worldwide, and with some specific effects felt in California. However, no scientific study has established a direct causal link between individual land use project impacts and global warming.

Cumulative impacts are the collective impacts of one or more past, present, or future projects, that when combined, result in adverse changes to the environment. Climate change is a global environmental problem in which: (a) any given development project contributes only a small portion of any net increase in GHGs and (b) global growth is continuing to contribute large amounts of GHGs across the world. No individual project would result in a significant impact on global climate change, or an environmental impact resulting from global climate change. Therefore, this section addresses climate change primarily as a cumulative impact.

This section begins by providing general background information on climate change and meteorology. It then discusses the regulatory framework for global climate change, provides data on the existing global climate setting, and evaluates potential global greenhouse gas emissions associated with the proposed project. Modeled project emissions are estimated based on the land uses proposed as part of the Master Plan, vehicle data, and project trip generation, among other variables. The section then evaluates whether the project could cause a cumulatively considerable contribution to climate change by conflicting with the implementation of GHG reduction measures under AB 32 or other State regulations. The information and analysis provided in this section rely primarily on the Climate Action Team 2006 Final Report, Intergovernmental Panel on Climate Change (IPCC) Assessment Reports, various California Air Resources Board (CARB) staff reports, and other related global climate change documents that provide background information on the impacts of greenhouse gas emissions.

1. Setting

The following discussion provides an overview of global climate change, its causes, and its potential effects. The regulatory framework relating to global climate change is also summarized.

a. Global Climate Change Background. A description of global climate change and its sources are provided below.

[1] State of California, Department of Justice, 2008. Comment letter to the City of Concord re "Concord Community Reuse Plan Draft Environmental Impact Report – SCH #2007052094". August 8.

(1) Global Climate Change. Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. The Earth's average near-surface atmospheric temperature rose 0.6 ± 0.2° Celsius (°C) or 1.1 ± 0.4° Fahrenheit (°F) in the 20th century. The prevailing scientific opinion on climate change is that most of the warming observed over the last 50 years is attributable to human activities. The increased amounts of carbon dioxide (CO_2) and other GHGs are the primary causes of the human-induced component of warming. GHGs are released by the burning of fossil fuels, land clearing, agriculture, and other activities, and lead to an increase in 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:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydroflourocarbons (HFCs)
- Perflourocarbons (PFCs)
- Sulfur Hexaflouride (SF_6)

Over the last 200 years, humans 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 manmade GHGs include naturally-occurring GHGs such as CO_2, methane, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

Certain gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above 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 gases listed above only.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each greenhouse gas 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 carbon dioxide, the most abundant GHG; the definition of GWP for a particular greenhouse gas is the ratio of heat trapped by one unit mass of the greenhouse gas to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of "CO_2

[2] The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduces the heat escaping, 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.

equivalents" (CO_2eq). Table V.K-1 shows the GWPs for each type of GHG. For example, sulfur hexaflouride is 22,800 times more potent at contributing to global warming than carbon dioxide. The following discussion summarizes the characteristics of the six GHGs.

Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals and plants, volcanic outgassing, decomposition of organic matter and evaporation from the oceans. Human caused sources of CO_2, include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. Natural sources release approximately 150 billion tons of CO_2 each year, far outweighing the 7 billion tons of man-made emissions of CO_2 each year. Nevertheless, natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of man-made CO_2, and consequently, the gas is building up in the atmosphere.

In 2002, CO_2 emissions from fossil fuel combustion accounted for approximately 98 percent of man-made CO_2 emissions and approximately 84 percent of California's overall GHG emissions (CO_2eq). The transportation sector accounted for California's largest portion of CO_2 emissions, with gasoline consumption making up the greatest portion of these emissions. Electricity generation was California's second largest category of GHG emissions.

Table V.K-1: Global Warming Potentials

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	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_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

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

Methane (CH_4). Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California and in the United States as a whole. Agricultural processes such as intestinal fermentation, manure management, and rice cultivation are also significant sources of CH_4 in California. Methane accounted for approximately 6 percent of gross climate change emissions (CO_{2eq}) in California in 2002.

Total annual emissions of methane are approximately 500 million tons, with manmade emissions accounting for the majority. As with CO_2, the major removal process of atmospheric methane – a chemical breakdown in the atmosphere – cannot keep pace with source emissions, and methane concentrations in the atmosphere are increasing.

Nitrous Oxide (N_2O). Nitrous oxide 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. Nitrous oxide is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N_2O, 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 N_2O emissions in California. Nitrous oxide emissions accounted for nearly 7 percent of man-made GHG emissions (CO_2eq) in California in 2002.

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.[3] PFCs and SF_6 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 leads to greater use of PFCs. HFCs, PFCs, and SF_6 accounted for about 3.5 percent of man-made GHG emissions (CO_2eq) in California in 2002.

The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3 to 10.5°F by the end of the century.[4] Because GHGs persist for a long time in the atmosphere (see Table V.K-1), accumulate over time, and are generally well-mixed, their impact on the atmosphere cannot be tied to a specific point of emission.

Climate change refers to any significant change in measures of climate (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 or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (e.g., changes in ocean circulation and reduction in sunlight from the addition of GHGs and other gases to the atmosphere from volcanic eruptions)
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., from deforestation, reforestation, urbanization, and desertification)

The impact of human activities on global climate change is readily apparent in the observational record. For example, surface temperature data show that 11 of the 12 years from 1995 to 2006 rank among the 12 warmest since 1850, the beginning of the instrumental record for global surface temperature. In addition, the atmospheric water vapor content has increased since at least the 1980s over land, sea, and in the upper atmosphere, consistent with the capacity of warmer air to hold more water vapor; ocean temperatures are warmer to depths of 3,000 feet; and a marked decline has occurred in mountain glaciers and snow pack in both hemispheres, and polar ice, and ice sheets in both the Arctic and Antarctic regions.

[3] 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.

[4] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of CO_2, CH_4 and N_2O, from before the start of industrialization (around 1750) to over 650,000 years ago. For that period, it was found that CO_2 concentrations ranged from 180 parts per million (ppm) to 300 ppm. For the period from around 1750 to the present, global CO_2 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 preindustrial period range.

The primary effect of global climate change has been a rise in the average global tropospheric[5] temperature of 0.2°C per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates 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, but are not limited to:

- The loss of sea ice and mountain snow pack, resulting in higher sea levels and higher 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;
- Rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps in the Greenland and Antarctic ice sheets;
- Changes in weather that include widespread changes in 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;
- Decline of the Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;
- Increase in the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas of Los Angeles and the San Joaquin Valley by the end of the 21st century; and
- High potential for erosion of California's coastlines and seawater intrusion into the Delta and levee systems due to the rise in sea level.

(2) Emissions Inventories. An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs and, thereby, accounts for the amount of GHGs emitted to or removed from the atmosphere over a specific period of time by a particular source is a well-recognized and useful tool for addressing climate change. This section summarizes the latest information on global, United States, California, and local GHG emission inventories.

Global Emissions. Worldwide emissions of GHGs in 2004 were 30 billion tons of CO_2eq per year[6] (including both ongoing emissions from industrial and agricultural sources, but excluding emissions from land-use changes).

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

[6] United Nations Framework Convention on Climate Change (UNFCCC), 2007. *Sum of Annex I and Non-Annex I Countries Without Counting Land-Use, Land-Use Change and Forestry (LULUCF). Predefined Queries: GHG total without LULUCF* (Annex I Parties). Bonn, Germany, http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php, accessed May 2.

U.S. Emissions. In 2004, the United States emitted about 8 billion tons of CO_2eq or about 25 tons/year/person. Of the four major sectors nationwide – residential, commercial, industrial and transportation – transportation accounts for the highest fraction of GHG emissions (approximately 35 to 40 percent); these emissions are entirely generated from direct fossil fuel combustion. Between 1990 and 2006, total U.S. GHG emissions rose approximately 14.7 percent.[7]

State of California Emissions. According to CARB emission inventory estimates, California emitted approximately 480 million metric tons[7] of CO_2eq emissions in 2004.[8] 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 carbon dioxide 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.[9] Another factor that has reduced California's fuel use and GHG emissions is its mild climate compared to that of many other states.

The California 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 CO_2eq) was as follows:

- Carbon dioxide (CO_2) accounted for 83.3 percent;
- Methane (CH_4) accounted for 6.4 percent;
- Nitrous oxide (N_2O) accounted for 6.8 percent; and
- Fluorinated gases (HFCs, PFC, and SF_6) accounted for 3.5 percent.[10]

The California Air Resources Board 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 25 percent, and industrial sources at 20 percent. Agriculture is the source of approximately 6 percent, as are residential and commercial activities.[11]

CARB 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. CARB's current GHG emission inventory covers the years 1990-2004 and is based on State-wide fuel use,

[7] U.S. Environmental Protection Agency (EPA). 2008. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. http://www.epa.gov/climatechange/emissions/downloads/2008_GHG_Fast_Facts.pdf.

[7] A metric ton is equivalent to approximately 1.1 tons.

[8] California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. Available at http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed November 2008.

[9] 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.

[10] California Environmental Protection Agency, 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature. March.

[11] California Air Resources Board (CCARB), 2008. http://www.climatechange.ca.gov/inventory/index.html. September.

processing, and activity data. 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.

CARB staff has projected 2020 unregulated GHG emissions, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions. CARB staff estimates the State-wide 2020 unregulated GHG emissions will be 596 million metric tons (MMT) of CO_2eq.

GHG emissions in 2020 from the transportation sector as a whole are expected to increase to 225.4 MMT of CO_2eq. The industrial sector consists of large stationary sources of GHG emissions and includes oil and gas production and refining facilities, cement plants, and large manufacturing facilities. Emissions for this sector are forecast to grow to 100.5 MMT of CO_2eq by 2020, an increase of approximately 5 percent from the average emissions level of 2002-2004. The commercial and residential sectors are expected to contribute 46.7 MMT of CO_2eq, or about 8 percent of the total State-wide GHG emissions in 2020.

Bay Area Emissions. In the Bay Area, fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of the Bay Area's GHG emissions, accounting for just over half of the Bay Area's 85 million tons of GHG emissions in 2002. Industrial and commercial sources were the second largest contributors of GHG emissions, with about 25 percent of total emissions. Domestic sources (e.g., home water heaters, furnaces, etc.) account for about 11 percent of the Bay Area's GHG emissions, followed by power plants at 7 percent. Oil refining currently accounts for approximately 6 percent of the total Bay Area GHG emissions.[12]

At the time this EIR was prepared, GHG emission inventories were not available for Foster City.

b. Regulatory Framework

The regulatory framework and other governmental activities addressing GHG emissions and global climate change are discussed in this section.

(1) Federal Regulations. There are no adopted federal regulations for GHG emissions. In February 2002, the United States government announced a comprehensive strategy to reduce the GHG intensity[13] of the American economy by 18 percent over the 10-year period from 2002 to 2012. This strategy has three basic components: (1) slowing the growth of emissions, (2) strengthening science, technology and institutions, and (3) enhancing international cooperation.[14]

In 2002, the United States government also announced a climate change research initiative to focus on key remaining gaps in climate change science. To meet this goal, the federal multiagency Climate Change Science Program (CCSP) was established to investigate natural and human-induced changes in the Earth's global environmental system; to monitor, understand, and predict global change; and to

[12] Bay Area Air Quality Management District (BAAQMD), 2006. *Source Inventory of Bay Area Greenhouse Gas Emissions.* November.

[13] GHG intensity measures the ratio of GHG emissions to economic output.

[14] Environmental Protection Agency. 2008. Climate Change: Basic Information. www.epa.gov/climatechange/basicinfo.html.

provide a sound scientific basis for national and international decision-making. The federal government established the multi-agency Climate Change Technology Program (CCTP) to accelerate the development and deployment of key technologies which offer great promise to reduce GHG emissions significantly. The CCTP works closely with CCSP to make further progress in understanding and addressing global climate change. The United States Environmental Protection Agency's (U.S. EPA's) primary role in CCSP is evaluating the potential consequences of climate variability and the effects on air quality, water quality, ecosystems, and human health in the United States.

Currently there are no adopted federal regulations to control global climate change. However, recent authority has been granted to the U.S. EPA that may change the voluntary approach taken under the current administration to address this issue. On April 2, 2007, the United States Supreme Court ruled that the U.S. EPA has the authority to regulate CO_2 emissions under the federal Clean Air Act (CAA).

Over a decade ago, most countries joined an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), to begin to consider what can be done to reduce global warming and to cope with the physical and socioeconomic effects of climate change. More recently, a number of nations have ratified an amendment to the treaty: the Kyoto Protocol, which has a more powerful effect on its signatories.

Because the Kyoto Protocol will affect virtually all major sectors of the economy, it is considered to be the most far-reaching agreement on the environment and sustainable development ever adopted. Most of the world's countries eventually agreed to the Protocol, but some nations (including the United States) chose not to ratify it. Following ratification by Russia, the Kyoto Protocol entered into force on February 16, 2005, for signatory nations.

As of July 2008, 182 countries have ratified the Kyoto Protocol. Participating nations are separated into Annex 1 countries (i.e., industrialized nations) and Non-Annex 1 countries (i.e., developing nations) that have different requirements for GHG reductions. The goal of the Protocol is to achieve overall emissions reduction targets for six GHGs by 2012. The six GHGs regulated under the Protocol are CO_2, CH_4, N_2O, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons. Each nation must reduce GHG emissions by a certain percentage below 1990 levels (e.g., 8 percent reduction for the European Union, 6 percent reduction for Japan). The average reduction target for nations participating in the Kyoto Protocol is approximately 5 percent below 1990 levels. Although the United States has not ratified the Protocol, on February 14, 2002, it established a goal of an 18 percent reduction in GHG emissions intensity by 2012. GHG intensity is the ratio of GHG emissions to economic output (i.e., gross domestic product).

(2) State Regulations. In 1967, the California Legislature established the CARB through the Mulford-Carrell Act, which combined two Department of Health bureaus, the Bureau of Air Sanitation and the Motor Vehicle Pollution Control Board, to establish the Air Resources Board (CARB). Since its formation, the CARB has worked with the public, the business sector, and local governments to find solutions to California's air pollution problems. The resulting State air quality standards set by the CARB continue to outpace the rest of the nation and have prompted the development of new anti-smog technology for industrial facilities and motor vehicles.

In a response to the transportation sector's significant contribution to California's CO_2 emissions, Assembly Bill 1493 (AB 1493, Pavley) was enacted on July 22, 2002. AB 1493 requires CARB 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, the CARB considered cost effectiveness, technological feasibility, and economic impacts. CARB adopted the standards in September 2004. When fully phased-in, the near-term (2009 to 2012) standards would result in a reduction in GHG emissions of approximately 22 percent compared to the emissions from the 2002 fleet, while the mid-term (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 U.S. EPA. However, in December 2007, the U.S. EPA denied the request from California for the waiver. In January 2008, the California Attorney General filed a petition for review of the U.S. EPA's decision in the Ninth Circuit Court of Appeals; in July 2008, the Ninth Circuit granted U.S. EPA's motion to reconsider the earlier denial of a motion to dismiss California's lawsuit, and the case moved to the Washington D.C. Circuit Court of Appeals. However, no final decision on that petition has been published as of January 2009.

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "Global Warming Solutions Act," passed by the California State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020, a reduction of approximately 25 percent, and then an 80 percent reduction below 1990 levels by 2050. The CARB has established the level of GHG emissions in 1990 at 427 million metric tons (MMT) of CO_2eq. The emissions target of 427 MMT requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. CARB approved a Scoping Plan on December 11, 2008 that outlines the main State strategies for meting the 2020 deadline. Emission reductions that are projected to result from the recommended measures in the Scoping Plan are expected to total 174 MMT of CO_2eq, which would allow California to attain the emissions goal of 427 MMT of CO_2eq by 2020. The Scoping Plan includes a range of GHG reduction actions that include: expanding and strengthening existing energy efficiency programs and building/appliance standards; increasing the State-wide renewable energy mix; developing a cap-and-trade system for GHGs; establishing targets for transportation-related GHG emissions; adopting and implementing emissions/energy measures pursuant to existing State laws and policies; and creating targeted fees.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed CARB and the newly created Climate Action Team (CAT) [15] to identify a list of "discrete early action GHG reduction measures" that can be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed Executive Order S-1-07, further solidifying California's dedication to reducing GHGs by setting a new Low Carbon Fuel Standard. The Executive Order sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs CARB to consider the Low Carbon Fuel Standard as a discrete early action measure.

[15] CAT is a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of CARB's jurisdiction.

In June 2007 CARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on High Global Warming Potential Refrigerants, and Landfill Methane Capture). [16] Discrete early action measures are measures that are required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code (HSC) Section 38560.5. The CARB adopted additional early action measures in October 2007 that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of perfluorocarbons from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and sulfur hexafluoride (SF_6) reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT.[17]

To assist public agencies in the mitigation of GHG emissions or analyzing the effects of GHGs under CEQA, including the effects associated with transportation and energy consumption, Senate Bill 97 (Chapter 185, 2007) requires the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines on how to minimize and mitigate a project's GHG emissions. OPR is required to prepare, develop, and transmit these guidelines on or before July 1, 2009 and the Resources Agency is required to certify and adopt them by January 1, 2010. OPR has not issued any formal regulations as of November 2008. However, preliminary guidance released by OPR in June 2008 suggests that global climate change analyses in CEQA documents should be conducted for all projects that release GHGs, and that mitigation measures to reduce emissions should be incorporated into projects, to the extent feasible.

SB 375, which was signed into law on October 1, 2008, provides emissions-reduction goals and provides incentives for local governments and developers to follow new conscientiously planned growth patterns. SB 375 enhances the CARB's ability to reach AB 32 goals by directing CARB to develop regional greenhouse gas emission reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035. Regional planning agencies are also required to submit land use and transportation plans to meet the GHG reduction targets set by CARB.

Additionally, SB 375 provides incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The bill exempts home builders from certain CEQA requirements if they build projects consistent with the new sustainable community strategies. It will also encourage the development of more alternative transportation options, to promote healthy lifestyles and reduce traffic congestion.

As noted above, CARB prepared a Scoping Plan pursuant to AB 32 containing the main strategies California will use to reduce the GHGs that cause climate change. On December 11, 2008 CARB approved a final draft of the Scoping Plan, including measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures.[18] The Scoping Plan, even after CARB approval, remains a recommendation. The measures

[16] California Air Resources Board. 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

[17] California Air Resources Board. 2007. "CARB approves tripling of early action measures required under AB 32". News Release 07-46. http://www.arb.ca.gov/newsrel/nr102507.htm. October 25.

[18] California Air Resources Board. 2008. *Climate Change Proposed Scoping Plan: a framework for change.* Approved December 11.

in the Scoping Plan will not be binding until after they are adopted through the normal rulemaking process, with the necessary public input.

(3) Local Policies. While the Foster City General Plan does not include policies that specifically address global climate change, the following goals and policies listed in Table V.K-2 would be expected to reduce GHG emissions.

2. Impacts and Mitigation Measures

This section evaluates significant impacts to global climate change that could result from implementation of the proposed Master Plan (the proposed project would not result in less-than-significant impacts to global climate change). Because it is not possible to tie specific GHG emissions to actual changes in climate, this evaluation focuses on the project's emission of GHGs. Mitigation measures are identified as appropriate.

a. Criteria of Significance. There is no CEQA statute, regulation, or judicial decision that requires an EIR to analyze the GHG emissions of a project, or identifies under what circumstances a project would have a significant impact on global warming. The recommended approach for GHG analysis included in OPR's June 2008 release is to (1) identify and quantify GHG emissions, (2) assess the significance of the impact on climate change, and (3) if significant, identify alternatives and/or mitigation measures to reduce the impact below significance.[19] Neither the CEQA statute nor Guidelines prescribe thresholds of significance or a particular methodology for performing an impact analysis, and no State agency or local air quality management district has issued any regulations or standards of significance for the analysis of GHGs under CEQA; as with most environmental topics, significance criteria are left to the judgment and discretion of the lead agency.

CEQA Guidelines Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further, states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

Some policy makers and regulators suggest that a zero emissions threshold would be appropriate when evaluating GHGs and their potential effect on climate change. However, most feel that such an absolute threshold would be analytically impractical and would interfere with the ability of the economy to function. Such a rule also appears inconsistent with the State's approach to mitigation of climate change impacts. AB 32 does not prohibit all new GHG emissions; rather, it requires a reduction in State-wide emissions to a given level. Thus, AB 32 recognizes that GHG emissions will continue to occur; increases will result from certain activities, but reductions must occur elsewhere.

[19] California, State of, 2008. Governor's Office of Planning and Research. *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review*. June 19.

Table V.K-2: General Plan Goals and Policies that Would Reduce GHG Emissions

Goal LUC-B	*Promote Proper Site Planning, Architectural Design and Property Maintenance.* Ensure high quality site planning and architectural design for all new development, renovation or remodeling and require property maintenance to maintain the long-term health, safety and welfare of the community.
Goal LUC-H	*Encourage Mixed Use Projects.* Encourage mixed use projects, with the residential portion of mixed use projects built at the maximum allowed densities to reduce trips to, from and within the City.
Goal LUC-I	*Provide for Diversified Transportation Needs.* Develop, improve and maintain a circulation system which provides efficient and safe access for private vehicles, commercial vehicles, public transit, emergency vehicles, bicycles and pedestrians.
Goal LUC-J	*Maintain Acceptable Operating Conditions on the City's Road Network.* Maintain acceptable operating conditions on the City's road network at or above Level of Service D and encourage the maximum effective use of public and private vehicles, reduce the growth in peak hour traffic volumes and reduce single passenger trips.
Policy LUC-18	*Mixed Use Residential/Commercial Projects.* The City will encourage housing production by allowing mixed use residential/commercial projects to be built with the residential portion of mixed use projects built at the maximum allowed densities to reduce trips to and from and within the City. In allowing higher residential densities for mixed use projects, the project must comply with the goals and policies of the General Plan, including Policies LUC-15 and LUC-16.
Policy LUC-52	*Transportation Systems Management (TSM).* The City will participate in an ongoing joint effort with several neighboring cities to adopt and enforce a Traffic Systems Management (TSM) program. The program shall require the participation of all future and existing commercial and industrial employers.
Policy LUC-53	*Bicycle Routes and Pedestrian Paths.* Maintain a system of bicycle routes and pedestrian paths, which will include separate bicycle lanes and posted bicycle routes. Pedestrian pathways and easements shall be maintained, either by the City, or, in the case of private ownership, according to a maintenance agreement or landscaping district agreement applicable to the pathway/easement.
Policy LUC-54	*Coordination with SamTrans.* The City shall work with Sam Trans in defining new routes and improving the public transit and transportation system.
Policy LUC-59	*Bicycle Parking.* Secured bicycle parking shall be encouraged for all commercial and industrial buildings. The City will continue to allow required parking to be reduced by one space for every eight bicycle parking spaces provided, per Chapter 17.62 of the Municipal Code.
Goal PC-F	*Provide Adequate Open Space to Serve Existing and New Development.* Assure the provision of adequate open space to serve existing and new development and preserve existing open spaces with public access easements within private commercial developments.
Goal PC-G	*Protect and Conserve Natural Resources.* Protect and conserve wildlife habitat, energy resources, land resources, air quality, and the quality and quantity of water resources
Policy PC-29	*Energy Conservation.* Promote energy conservation in existing and new development (see Housing Element).
Policy H-A-4-a	*Air Quality Impacts.* When site-specific development is proposed and/or a Rezoning application is processed, potential air quality impacts from project traffic shall be studied, and mitigation measures to ensure compliance with the Bay Area Air Quality Management District standards in effect at the time shall be recommended if necessary.
Policy H-B-3	*Encourage Energy Conservation in Housing.* Encourage adoption of energy conservation measures and promote energy conservation programs that provide assistance for energy conservation improvements.
Goal PC-C	*Maintain and Improve the City's Pedway and Bikeway System.* Maintain and improve the pedway system that surrounds that city and the walkway system that provides safe access to parks, schools and other streets.
Goal PC-F	*Provide Adequate Open Space to Serve Existing and New Development.* Assure the provision of adequate open space to serve existing and new development and preserve existing open spaces with public access easements within private commercial developments.
Goal PC-G	*Protect and Conserve Natural Resources.* Protect and conserve wildlife habitat, energy resources, land resources, air quality, and the quality and quantity of water resources.
Policy PC-9	*Bikepath System.* Develop a Foster City bikepath system to connect major work, shopping, school, civic and recreational destinations throughout the city.
Policy PC-11	*Pedway and Bikeway System Maintenance and Improvement.* Continue to maintain, expand and improve the existing walkway and pedway system.
Policy PC-28	*Air Quality.* Reduce the impact of development on local air quality.
Policy PC-29	*Energy Conservation.* Promote energy conservation in new and existing development.

Source: City of Foster City General Plan, 1993. May; LSA Associates, Inc., 2008.

Because no applicable numeric thresholds have yet been defined, and because the precise causal link between an individual project's emissions and global climate change has not been developed, it is reasonable to conclude that an individual development project cannot generate a high enough quantity of GHG emissions to affect global climate change. However, individual projects incrementally contribute toward the potential for global climate change on a cumulative basis in concert with all other past, present, and reasonably foreseeable future projects. This analysis identifies qualitative factors to determine whether the Master Plan's emissions should be considered cumulatively significant. Until the City or other regulatory agency devises a generally applicable climate change threshold, the analysis used in this study may or may not be applicable to other City projects.

Accordingly, for purposes of this analysis, the proposed project would result in a cumulatively considerable contribution to the cumulative impact of global climate change if it would substantially conflict with or obstruct the implementation of GHG emissions reduction goals under AB 32 or other State regulations.

b. GHG Emissions Background. Emissions estimates for the proposed Master Plan are discussed below. GHG emissions estimates are provided herein for informational purposes only, as there is no established quantified GHG emissions threshold. Bearing in mind that CEQA does not require "perfection" but instead "adequacy, completeness, and a good faith effort at full disclosure," the analysis below is based on methodologies and information available to the City at the time this EIR was prepared. Estimation of GHG emissions in the future does not account for all changes in technology that may reduce such emissions; therefore, the estimates are based on past performance and represent a scenario that is worse than that which is likely to be encountered (after energy-efficient technologies have been implemented). While information is presented below to assist the public and the City's decision makers in understanding the project's potential contribution to global climate change impacts, the information available to the City is not sufficiently detailed to allow a direct comparison between particular project characteristics and particular climate change impacts, nor between any particular proposed mitigation measure and any reduction in climate change impacts.

Construction and operation of Master Plan development would generate GHG emissions, with the majority of energy consumption (and associated generation of GHG emissions) occurring during the project's operation (as opposed to its construction). Typically, more than 80 percent of the total energy consumption takes place during the use of buildings and less than 20 percent is consumed during construction.[20] As of yet, there is no study that quantitatively assesses all of the GHG emissions associated with each phase of the construction and use of an individual development.

Overall, the following activities associated with the proposed project could directly or indirectly contribute to the generation of GHG emissions:

- **Removal of Vegetation:** The net removal of vegetation for construction results in a loss of the carbon sequestration in plants. However, planting of additional vegetation would result in additional carbon sequestration and lower the carbon footprint of the project.
- **Construction Activities:** During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of

[20] United Nations Environment Programme (UNEP), 2007. *Buildings and Climate Change: Status, Challenges and Opportunities*, Paris, France.

which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment.

- **Gas, Electric and Water Use:** Natural gas use results in the emissions of two GHGs: CH_4 (the major component of natural gas) and CO_2 from the combustion of natural gas. Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy intensive. Preliminary estimates indicate that the total energy used to pump and treat this water exceeds 6.5 percent of the total electricity used in the State per year.[21]
- **Solid Waste Disposal:** Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste and they produce additional GHGs to varying degrees. Landfilling, the most common waste management practice, results in the release of CH_4 from the anaerobic decomposition of organic materials. CH_4 is 25 times more potent a GHG than CO_2. However, landfill CH_4 can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.
- **Motor Vehicle Use:** Transportation associated with the proposed project would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips.

GHG emissions associated with the project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with project-related vehicular trips and stationary source emissions, such as natural gas used for heating. Preliminary guidance from OPR and recent letters from the Attorney General critical of CEQA documents that have taken different approaches indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, and construction activities. The calculation presented below includes construction emissions in terms of CO_2, and annual CO_2eq GHG emissions from increased energy consumption, water usage, solid waste disposal, as well as estimated GHG emissions from vehicular traffic that would result from implementation of the Master Plan.

GHG emissions generated by the proposed project would predominantly consist of CO_2. In comparison to criteria air pollutants (see Section V.I, Air Quality), such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a substantially longer period of time. While emissions of other GHGs, such as CH_4, are important with respect to global climate change, emission levels of other GHGs are less dependent on the land use and circulation patterns associated with the proposed land use development project than are levels of CO_2.

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. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

[21] California Energy Commission (CEC), 2004. *Water Energy Use in California* (online information sheet) Sacramento, CA, August 24. Website: energy.ca.gov/pier/iaw/industry/water.html. Accessed July 24, 2007.

It is anticipated that development of the project site would require demolition of existing buildings and hauling of demolished materials. Each of the new buildings would be constructed over a period of 12-18 months. The only GHG with well-studied emissions characteristics and published emissions factors for construction equipment is CO_2. Using the URBEMIS 2007 model, it is estimated that the average daily CO_2 emissions associated with construction equipment exhaust for the proposed project would be approximately 2,100 tons per year, with total project construction-related CO_2 emissions of 18,932 tons. Model output sheets are included in Appendix C.

The project would be required to implement the construction exhaust control measures listed in Mitigation Measure AIR-1 of Section V.I, Air Quality, including minimization of construction equipment idling and implementation of proper engine tuning and exhaust controls. Both of these measures would reduce GHG emissions during the construction period (but other measures would be required to reduce GHG emissions to a less-than-significant level).

Architectural coatings used in construction of the specific Master Plan projects may contain volatile organic compounds (VOCs) that are similar to reactive organic gases (ROG) and are part of ozone precursors. However, there are no significant emissions of GHGs from architectural coatings.

c. Significant Climate Change Impacts. Significant impacts of the proposed project are described in the following section. Long-term operation of the proposed project would generate GHG emissions from area and mobile sources, and indirect emissions from stationary sources associated with energy consumption. Mobile-source emissions of GHGs would include project-generated vehicle trips associated with employee commutes, and visitor and delivery vehicle trips to the project site. Area-source emissions would be associated with activities such as landscaping and maintenance of proposed land uses, natural gas for heating, and other sources. Increases in stationary source emissions would also occur at off-site utility providers as a result of demand for electricity, natural gas, and water by the proposed uses.

The existing Gilead Sciences Campus includes 17 buildings encompassing approximately 629,154 square feet of interior space. The campus has approximately 1,200 staff employed at the Foster City location. The proposed project would increase the total interior square footage to up to approximately 1,200,480 square feet to accommodate the increase in staffing levels that is projected as part of the Master Plan (staffing is projected to reach 3,100 by Master Plan buildout). The GHG emission estimates presented in Tables V.K-3 through V.K-5 show the existing campus emissions, the emissions associated with the level of development envisioned by the proposed Master Plan, and the net increase in greenhouse gas emissions, respectively.

Table V.K-3 Existing Greenhouse Gas Emissions

Emission Source	Emissions (Tons Per Year)				
	CO_2	CH_4	N_2O	CO_2eq	Percent of Total
Vehicles[a]	8,354	0.260	0.850	8,614	54%
Electricity Production	6,400	0.070	0.039	6,410	40%
Natural Gas Combustion[a]	849	0.035	0.034	860	5%
Solid Waste	N/A	N/A	N/A	95	1%
Other Area Sources[b]	1	N/A	N/A	1	0%
Total Annual Emissions	16,000	0.37	0.92	15,980	100%

Note: Table data may not sum to totals due to independent rounding.
[a] CO_2 emissions for Vehicles and Natural Gas input from URBEMIS 2007 outputs.
[b] Includes emissions from landscaping equipment.
Source: LSA Associates, Inc., December 2008.

Table V.K-4 Proposed Master Plan GHG Emissions

Emission Source	Emissions (Tons Per Year)				
	CO_2	CH_4	N_2O	CO_2eq	Percent of Total
Vehicles[a]	16,452	0.510	1.700	16,970	56%
Electricity Production	12,000	0.130	0.074	12,000	39%
Natural Gas Combustion[a]	1,279	0.067	0.064	1,300	4%
Solid Waste	N/A	N/A	N/A	244	1%
Other Area Sources[b]	1	N/A	N/A	1	0%
Total Annual Emissions	30,000	0.71	1.8	30,510	100%

Note: Table data may not sum to totals due to independent rounding.
[a] CO_2 emissions for Vehicles and Natural Gas input from URBEMIS 2007 outputs.
[b] Includes emissions from landscaping equipment.
Source: LSA Associates, Inc., December 2008.

Table V.K-5 Net Plan-Related Increase in GHG Emissions

Emission Source	Emissions (Tons Per Year)				
	CO_2	CH_4	N_2O	CO_2eq	Percent of Total
Vehicles[a]	8,098	0.250	0.850	8,356	58%
Electricity Production	5,600	0.060	0.035	5,590	38%
Natural Gas Combustion[a]	430	0.032	0.030	440	3%
Solid Waste	N/A	N/A	N/A	150	1%
Other Area Sources[b]	0	N/A	N/A	0	0%
Total Annual Emissions	14,000	0.340	0.880	14,530	100%

Note: Table data may not sum to totals due to independent rounding.
[a] CO_2 emissions for Vehicles and Natural Gas input from URBEMIS 2007 outputs.
[b] Includes emissions from landscaping equipment.
Source: LSA Associates, Inc., December 2008.

Energy and Natural Gas Use. Buildings represent 39 percent of U.S. primary energy use and 70 percent of electricity consumption.[22] The proposed project would increase the demand for electricity and natural gas due to the increased square footage and number of employees. The project would indirectly result in increased GHG emissions from off-site electricity generation at power plants (approximately 5,600 tons of CO_2eq/year). Future electricity and natural gas estimates were projected based on 2007 energy use data at the existing Gilead Sciences Campus.[23]

Water Use. Water-related energy use consumes 19 percent of California's electricity every year.[24] Energy use and related GHG emissions are based on water supply and conveyance, water treatment, water distribution, and wastewater treatment. The additional water demand for the proposed project is projected to be approximately 44 acre-feet per year.

Solid Waste Disposal. The proposed project would also generate solid waste during the operation phase of the project. As previously described in Chapter V.J Public Services and Utilities, the CIWMB estimates an average waste generation rate of 3.6 pounds per employee per day. The 1,900 new employees resulting from buildout of the proposed Master Plan would generate approximately 3.4 tons per day of solid waste. To determine the net GHG emissions from landfilling, the CO_2eq emissions from CH_4 generation, carbon storage (treated as negative emissions), and transportation CO_2 emissions were considered.

Mobile Sources. Mobile sources (vehicle trips and associated miles traveled) would be the largest emission source of GHGs associated with the proposed project. Transportation is also the largest source of GHG emissions in California and represents approximately 38 percent of annual CO_2 emissions generated in the State. Like most land use development projects, vehicle miles traveled (VMT) is the most direct indicator of CO_2 emissions from the proposed project and associated CO_2 emissions function as the best indicator of total GHG emissions. The proposed project would generate an additional 5,880 trips over current conditions.

The proposed project would generate up to 14,530 tons of CO_2eq per year of new emissions, as shown in Table V.K-5. The emissions from vehicle exhaust would comprise approximately 58 percent of the project's total CO_2eq emissions. The emissions from vehicle exhaust are controlled by the State and federal governments and are outside the control of Foster City. However, the emissions from project-related vehicles would be reduced by the Transportation Demand Management (TDM) program currently implemented by Gilead Sciences (and required to be continued by Mitigation Measure TRANS-1), including a guaranteed ride home program, shuttle service to nearby rail station, carpool incentive program, and other measures summarized in Table V.K-6.

The remaining CO_2eq emissions are primarily associated with building heating systems and increased regional power plant electricity generation due to the project's electrical demands. Specific development projects proposed under the Master Plan would comply with existing State and federal regulations regarding the energy efficiency of buildings, appliances, and lighting, which would reduce the project's electricity demand. The new buildings constructed in accordance with current energy

[22] United States Department of Energy. 2003. *Buildings Energy Data Book.*

[23] Lang, Jeff, 2008. Director, Facilities and Operations, Gilead. Written communication with Kohar Shirikian, Assistant Planner, Foster City. August 29.

[24] California, State of, 2005. California Energy Commission. California's Water-Energy Relationship. November.

efficiency standards would be more energy efficient than the older industrial buildings that currently exist on the site. However, in the absence of supplementary mitigation measures, the Master Plan would obstruct the implementation of GHG reduction goals under AB 32.

At present, there is a federal ban on CFCs; therefore, it is assumed the project would not generate emissions of CFCs. The project may emit a small amount of HFC emissions from leakage and service of refrigeration and air conditioning equipment and from disposal at the end of the life of the equipment. However, the details regarding refrigerants to be used in the project site are unknown at this time. PFCs and sulfur hexafluoride are typically used in industrial applications, none of which would be used on the project site. Therefore, it is not anticipated that the project would contribute significant emissions of these additional CFCs, HFCs, or PFCs.

Impact GCC-1: Implementation of the Master Plan could conflict with implementation of the greenhouse gas reduction goals under AB 32 or other State regulations. (S)

The California Environmental Protection Agency Climate Action Team (CAT) and the California Air Resources Board (CARB) have developed several reports to achieve the Governor's GHG targets that rely on voluntary actions of California businesses, local government and community groups, and State incentive and regulatory programs. These include the CAT's 2006 "*Report to Governor Schwarzenegger and the Legislature*," CARB's 2007 "*Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California*," and CARB's "*Climate Change Proposed Scoping Plan: a Framework for Change.*"

The reports identify strategies to reduce California's emissions to the levels proposed in Executive Order S-3-05 and AB 32 that are applicable to proposed project. The Scoping Plan is the most recent document, and the strategies included in the Scoping Plan that apply to the project are contained in Table V.K-6, which also summarizes the extent to which the project would comply with the strategies to help California reach the emission reduction targets.

The strategies listed in Table V.K-6 are either part of the project, mitigation measures required elsewhere in this EIR, or requirements under local or State ordinances. With implementation of these strategies/measures, the project's contribution to cumulative GHG emissions would be reduced to a less-than-significant level.

In order to ensure that the proposed project complies with and would not conflict with or impede the implementation of reduction goals identified in AB 32, the Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor, the following mitigation measure shall be implemented. Many of the individual elements of this measure are already included as part of the proposed project or are required as part of project-specific mitigation measures recommended throughout this EIR.

Table V.K-6: Project Compliance with Greenhouse Gas Emission Reduction Strategies

Strategy	Project Compliance
Energy Efficiency Measures	
Energy Efficiency Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities). **Renewables Portfolio Standard** Achieve a 33 percent renewable energy mix statewide. **Green Building Strategy** Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	**Compliant with Mitigation Incorporated.** The proposed project would be required to comply with the updated Title 24 standards for building construction. In addition, the project would be required to comply with the requirements of Mitigation Measure GCC-1, identified below, including measures to incorporate energy efficient building design features.
Water Conservation and Efficiency Measures	
Water Use Efficiency Continue efficiency programs and use cleaner energy sources to move and treat water. Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions.	**Compliant with Mitigation Incorporated.** The project would be required to comply with the requirements of Mitigation Measure GCC-1, identified below, including measures to increase water use efficiency.
Solid Waste Reduction Measures	
Increase Waste Diversion, Composting, and Commercial Recycling, and Move Toward Zero-Waste Increase waste diversion from landfills beyond the 50 percent mandate to provide for additional recovery of recyclable materials. Composting and commercial recycling could have substantial GHG reduction benefits. In the long term, zero-waste policies that would require manufacturers to design products to be fully recyclable may be necessary.	**Compliant with Mitigation Incorporated.** The proposed project would be required to comply with Mitigation Measure GCC-1, identified below, including measures to increase solid waste diversion, composting, and recycling.
Transportation and Motor Vehicle Measures	
Vehicle Climate Change Standards. AB 1493 (Pavley) required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles and light duty trucks. Regulations were adopted by the CARB in September 2004. **Light-Duty Vehicle Efficiency Measures.** Implement additional measures that could reduce light-duty GHG emissions. For example, measures to ensure that tires are properly inflated can both reduce GHG emissions and improve fuel efficiency.	**Compliant.** The Master Plan does not involve the manufacture, sale, or purchase of vehicles. However, vehicles that operate within and access the project site would comply with any vehicle and fuel standards that the CARB adopts.

Table V.K-6 *Continued*

Strategy	Project Compliance
Adopt Heavy- and Medium-Duty Fuel and Engine Efficiency Measures. Regulations to require retrofits to improve the fuel efficiency of heavy-duty trucks that could include devices that reduce aerodynamic drag and rolling resistance. This measure could also include hybridization of and increased engine efficiency of vehicles. **Low Carbon Fuel Standard.** CARB identified this measure as a Discrete Early Action Measure. This measure would reduce the carbon intensity of California's transportation fuels by at least 10% by 2020. **Regional Transportation-Related Greenhouse Gas Targets.** Develop regional greenhouse gas emissions reduction targets for passenger vehicles. Local governments will play a significant role in the regional planning process to reach passenger vehicle greenhouse gas emissions reduction targets. Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces greenhouse gases associated with vehicle travel.	**Compliant.** Specific regional emission targets for transportation emissions do not directly apply to this project. However, the proposed project would be required to continue an extensive Transportation Demand Management (TDM) program already in place. The specific measures include a guaranteed ride home program (all carpool, vanpool, and transit participants), shuttle service to the nearby rail station, carpool incentive program, bike to work program, rebates for vanpool participants, commuter checks, flexible work hours, telecommuting option, vanpool program, bicycle racks and lockers, and other on-site amenities.
Measures to Reduce High Global Warming Potential (GWP) Gases. CARB has identified Discrete Early Action measures to reduce GHG emissions from the refrigerants used in car air conditioners, semiconductor manufacturing, and consumer products. CARB has also identified potential reduction opportunities for future commercial and industrial refrigeration, changing the refrigerants used in auto air conditioning systems, and ensuring that existing car air conditioning systems do not leak**.**	**Compliant.** New products used, sold, or serviced in the project site (after implementation of the reduction of GWP gases) would comply with future CARB rules and regulations as these new rules and regulations are implemented by the agency.

Source: LSA Associates, Inc., 2008.

Mitigation Measure GCC-1: To the extent feasible and to the satisfaction of the City, the following measures shall be incorporated into the design and construction of the Master Plan (including specific building projects):

Construction and Building Materials

- Use locally produced and/or manufactured building materials for construction of the project;
- Recycle/reuse demolished construction material; and
- Use "Green Building Materials," such as those materials which are resource efficient, and recycled and manufactured in an environmentally friendly way, including low Volatile Organic Compound (VOC) materials.

Energy Efficiency Measures

- Design all project buildings to exceed California Building Code's Title 24 energy standard, including, but not limited to any combination of the following:

- Increase insulation such that heat transfer and thermal bridging is minimized;
- Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption; and
- Incorporate ENERGY STAR or better rated windows, space heating and cooling equipment, light fixtures, appliances or other applicable electrical equipment.

- Design, construct and operate all newly constructed and renovated buildings and facilities as equivalent to "LEED Silver" or higher certified buildings;
- Develop an On-Site Renewable Energy System that consists of solar, wind, geothermal, biomass and/or bio-gas strategies. This system should reduce grid-based energy purchases and provide at least 2.5 percent[25] of the project energy cost from renewable energy. Such a strategy can include installation of photovoltaic panels, wind turbines, and solar and tankless hot water heaters;
- Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping;
- Use combined heat and power in appropriate applications[26];
- Install efficient lighting and lighting control systems. Use daylight as an integral part of lighting systems in buildings;
- Install light colored "cool" roofs and cool pavements;
- Install energy efficient heating and cooling systems, appliances and equipment, and control systems; and
- Install light emitting diodes (LEDs) for outdoor lighting.

Water Conservation and Efficiency Measures

- Devise a comprehensive water conservation strategy appropriate for the project and location. The strategy may include the following, plus other innovative measures that might be appropriate:
  - Create water-efficient landscapes within the development;
  - Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls;
  - Use reclaimed water for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water;
  - Design buildings to be water-efficient. Install water-efficient fixtures and appliances, including low-flow faucets, dual-flush toilets and waterless urinals; and

[25] Based on U.S. Green Building Council, LEED, 2005. *Green Building Rating System for New Construction & Major Renovations. Version 2.2.* October.

[26] Combined heat and power (CHP) systems (also known as "cogeneration") generate electricity (and/or mechanical energy) and thermal energy in a single, integrated system. The thermal energy recovered in a CHP system can be used for heating or cooling in buildings (e.g., heat recovery from diesel generators to provide space heating). CHP captures the heat that would be otherwise be rejected in traditional separate generation of electric or mechanical energy, increasing overall efficiency.

- Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.

Solid Waste Measures

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard);
- Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas; and
- Provide employee education about reducing waste and available recycling services. (LTS)

In addition, the project would also be subject to all applicable regulatory requirements, which would also reduce the GHG emissions of the project. After implementation of Mitigation Measure GCC-1 and application of regulatory requirements, the Master Plan would implement appropriate GHG reduction strategies and would not conflict with or impede implementation of reduction goals identified in AB 32, the Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor. Therefore, the project's contribution to cumulative GHG emissions would be reduced to a less-than-significant level.

3. Impacts to the Proposed Project from Global Climate Change.

Local temperatures could increase in time as a result of global climate change, with or without development as envisioned by the Master Plan. This increase in temperature could lead to other climate effects including, but not limited to, increased flooding due to increased precipitation and runoff, and a reduction in the Sierra snowpack. At present, the extent of climate change impacts is uncertain, and more extensive monitoring of runoff and snowpack is necessary for greater understanding of changes in hydrologic patterns. Studies indicate that increased temperatures could result in a greater portion of peak streamflows occurring earlier in the spring with decreases in late spring and early summer.[27] These changes could have implications for water supply, flood management, and ecosystem health.

The location of the project site (near San Francisco Bay) and the elevation of the site could expose the site to coastal hazards arising from global climate change, such as sea level rise. However, Foster City completed a levee improvement program in the early 1990s that was designed to rectify a levee that was considered to provide inadequate protection against the 100-year flood. In addition, Foster City and San Mateo officials are currently working to improve a section of levee in San Mateo that has been identified as inadequate. In the long-term, these improvements are expected to provide adequate protection against the estimated sea level rise in the San Francisco Bay. Additional information is provided in Chapter V.E Hydrology and Water Quality. Water supply is discussed in Section V.J, Public Services and Utilities. Given the protections offered by the levee improvement program and the site's elevation, the potential effects of climate change (e.g., effects of flooding on the project site due to sea level rise) on the proposed project would not be significant.

[27] US Global Change Research Program. 2001. Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change.