4.13 GLOBAL CLIMATE CHANGE

4.13.1 Introduction

It is widely recognized that anthropogenic emissions of greenhouse gases and aerosols are contributing to changes in the global climate, and that such changes could have adverse effects on the environment, the economy, and public health. Under CEQA, an analysis of the physical and environmental consequences of climate change and the contributions of individual development projects to this cumulative effect is therefore required. Greenhouse gases (GHGs) would be emitted as the result of construction, new and intensified land uses, decomposition of project-related wastes, and through project-related transportation. This section of the EIR discusses how the proposed project would contribute to cumulative, global climate change impacts by the emission of GHGs.

During development and operation of the Transit Zoning Code (SD84A and SD 84B) GHGs would be emitted as the result of construction activities and deliveries; new direct operational sources, such as natural gas usage; and indirect operational sources, such as production of electricity, transport of water, and decomposition of project-related wastes. GHGs would also be emitted by residents, visitors, and employees travelling to and from the Project Area. This EIR discusses how the development proposed under the Project's "Potential Net Development" would contribute to emissions of greenhouse gases, as well as how the proposed Redevelopment Agency's proposed project to demolish 30,000 square feet of existing structures and construct 220 affordable residential units, a community center, and open space would likewise contribute to greenhouse gas emissions..

This section was prepared based upon a literature review that included methodologies for preparing CEQA climate change analyses recently released by the California Office of Planning and Research (OPR)[24] as well as approaches prepared by a number of professional associations and agencies that have published suggested approaches and strategies for complying with CEQA's environmental disclosure requirements. Such organizations include the California Attorney General's Office (AGO), the California Air Pollution Control Officers Association (CAPCOA), the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), and the Association of Environmental Professionals (AEP).

The State of California, through Assembly Bill (AB) 32 and Executive Order S-3-05, has set statewide targets for the reduction of greenhouse gas emissions (see Applicable Plans and Regulations, below). CAPCOA's technical report, *CEQA and Climate Change*, states: For this EIR, emissions from sources such as construction, vehicles, energy consumption, and solid waste generation are inventoried and discussed quantitatively and qualitatively.[25] All emissions inventories are presented in metric tons unless otherwise indicated.

[24] OPR, Technical Advisory, CEQA and Climate Change: Addressing Climate Change Through CEQA Review, June 19, 2008.

25 CAPCOA, CEQA & Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act January 2008.

Sources used for this section include energy forecasts and consumption reports produced by the data from the 2007 URBEMIS air quality modeling software; the traffic report prepared for the proposed project; and information from the California Air Resources Board (CARB).

4.13.2 Existing Conditions

Overview of Climate Change

Global climate change refers to changes in the normal[26] weather of the earth measured by alterations in wind patterns, storms, precipitation, and temperature relative to historical averages. Such changes vary considerably by geographic location. Over time, the earth's climate has undergone periodic ice ages and warming periods, as observed in fossil isotopes, ice core samples, and through other measurement techniques. Recent climate change studies use the historical record to predict future climate variations and the level of fluctuation that might be considered statistically normal given historical trends.

Temperature records from the Industrial Age (ranging from the late 18th century to the present) deviate from normal predictions in both rate and magnitude. Most modern climatologists predict an unprecedented warming period during the next century and beyond, a trend that is increasingly attributed to human-generated greenhouse gas emissions resulting from the industrial processes, transportation, solid waste generation, and land use patterns of the twentieth and twenty-first centuries. According to the United Nations Intergovernmental Panel on Climate Change (IPCC), greenhouse gas emissions associated with human activities have grown since pre-industrial times, increasing by 70 percent between 1970 and 2004.[27] Increased greenhouse gas emissions are largely the result of increasing fuel consumption, particularly the incineration of fossil fuels.

The IPCC modeled several possible emissions trajectories to determine what level of reductions would be needed worldwide to stabilize global temperatures and minimize climate change impacts. Regardless of the analytic methodology used, global average temperature and sea level were predicted to rise under all scenarios.[28] In other words, there is evidence that emissions reductions can minimize climate change effects but cannot reverse them entirely. On the other hand, emissions reductions can reduce the severity of impacts, resulting in lesser environmental impacts. For example, the IPCC predicted that the range of global mean temperature increase from year 1990 to 2100, given different reductions scenarios, could range from 1.1°C to 6.4°C.[29]

The greenhouse gas emissions from an individual project, even a very large development project, would not individually generate sufficient greenhouse gas emissions to measurably influence global climate

[26] "Normal" weather patterns include statistically normal variations within a specified range.
[27] Intergovernmental Panel on Climate Change, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.
[28] Intergovernmental Panel on Climate Change, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.
[29] Intergovernmental Panel on Climate Change, 2007. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers. http://www.ipcc.ch/ipccreports/tar/wg1/339.htm

change.[30] However, climate change is an irreversible, significant cumulative impact on a global scale. Consideration of a project's impact to climate change, therefore, is essentially an analysis of a project's contribution to a cumulatively significant global impact through its emission of greenhouse gases.

Greenhouse Gases

Gases that trap heat in the atmosphere are called greenhouse gases because they transform the light of the sun into heat, similar to the glass walls of a greenhouse. Common GHGs include water vapor, carbon dioxide, methane, nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols. Without the natural heat trapping effect of greenhouse gas, the earth's surface would be about 34°C cooler.[31] However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. Global atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased markedly since 1750 as a result of human activities and now far exceed pre-industrial values.

Climate change results from radiative forcings and feedbacks. Radiative forcing is defined as the difference between the radiation energy entering the earth's atmosphere and the radiation energy leaving the atmosphere. GHGs allow solar radiation to penetrate the earth's atmosphere but slow the release of atmospheric heat. A feedback is an internal process that amplifies or dampens the climate's response to a specific forcing. For example, the heat trapped by the atmosphere may cause temperatures to rise or may alter wind and weather patterns. A gas or aerosol's global warming potential is defined as its ability to trap heat in the atmosphere; it is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas."[32]

Individual greenhouse gases have varying global warming potentials and atmospheric lifetimes (refer to Table 4.13-1 [Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases]). The carbon dioxide equivalent is a consistent methodology for comparing greenhouse gas emissions since it normalizes various greenhouse gas emissions to a consistent metric. The reference gas for global warming potential is carbon dioxide, therefore carbon dioxide has a global warming potential of one. By comparison, methane's global warming potential is 21, as methane has a greater global warming effect than carbon dioxide on a molecule per molecule basis.[33] One teragram ([Tg] equal to one million metric tons) of carbon dioxide equivalent (CO_2e) is the mass of a project's emissions of an individual greenhouse gas multiplied by the gas's global warming potential.

[30] Association of Environmental Professionals (AEP). 2007. Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents. http://www.califaep.org/userdocuments/ File/ AEP_Global_Climate_Change_June_29_Final.pdf; and OPR, Technical Advisory, CEQA and Climate Change: Addressing Climate Change Through CEQA Review, June 19, 2008, p. 6.
[31] CARB, 2006. CARB Proposed Early Actions to Mitigate Climate Change in California.
[32] U.S. Environmental Protection Agency (EPA). 2006a. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. Office of Atmospheric Programs.
[33] EPA, 2006b. Non CO_2 Gases Economic Analysis and Inventory. Global Warming Potentials and Atmospheric Lifetimes. http://www.epa.gov/nonco2/econ-inv/table.html.

Table 4.13-1 Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide	50–200	1
Methane	12 ±3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF_4)	50,000	6,500
PFC: Hexafluoroethane (C_2F_6)	10,000	9,200
Sulfur Hexafluoride (SF_6)	3,200	23,900

SOURCE: EPA, 2006b.
HFC = Hydrofluorocarbons
PFC = Perfluorocarbons

Of all greenhouse gases in the atmosphere, water vapor is the most abundant, important, and variable. While not considered a pollutant, it contributes to the enhanced greenhouse effect because the warming influence of greenhouse gases increases the amount of water vapor in the atmosphere. In addition to its role as a natural greenhouse gas, water vapor in the atmosphere helps to maintain a climate necessary for life. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves. Water vapor is not considered further in this analysis because it is generally accepted that anthropogenic activities have not directly increased the amount of water vapor in the atmosphere.[34]

Carbon dioxide (CO_2) is an odorless, colorless gas, which has both natural and anthropogenic sources. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of carbon dioxide are from burning coal, oil, natural gas, and wood. Concentrations of carbon dioxide were 379 parts per million (ppm) in 2005, which equates to an increase of 1.4 ppm per year since 1960.[35] Carbon dioxide is the most common greenhouse gas generated by California activities, constituting approximately 84 percent of all greenhouse gas emissions[36] and are mainly associated with in-state fossil fuel combustion and fossil fuel combustion in out-of-state power plants supplying electricity to California. Other activities that produce CO_2 emissions include mineral production, waste combustion, and land use changes that reduce vegetation.

[34] U.S. Environmental Protection Agency (EPA), September 8, 2009; http://www.epa.gov/climatechange/glossary.html#W, accessed January 6, 2010.
[35] IPCC, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.
[36] CEC, 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.

Methane (CH_4) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10 to 12 years), compared to some other GHGs (such as carbon dioxide, nitrous oxide, and CFCs). Methane has both natural and anthropogenic (human) sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane (EPA 2006b).

Nitrous oxide (N_2O), also known as laughing gas, is produced naturally by microbial processes in soil and water. Anthropogenic sources of N_2O include agricultural sources, industrial processing, fossil fuel-fired power plants, and vehicle emissions. Nitrous oxide also is used as an aerosol spray propellant and in medical applications.

Greenhouse Gas Emissions Inventories

Worldwide, United States, and California Inventories.

A greenhouse gas inventory is an accounting of the amount of greenhouse gases emitted to or removed from the atmosphere over a specified period of time attributed to activities by a particular entity (e.g., annual emissions and reductions attributed to the State of California). A greenhouse gas inventory also provides information on the activities that cause emissions and removals, as well as the methods used to make the calculations. In 2004, total worldwide greenhouse gas emissions were estimated to be 49,000 Tg CO_2e.[37] In 2006, greenhouse gas emissions in the U.S. were 7,054 Tg CO_2e, a 14.7 percent increase over 1990 emissions.[38]

California is the second largest contributor of greenhouse gas emissions in the U.S. and the sixteenth largest in the world.[39] In 2004, California produced 427 Tg CO_2e,[40] which is approximately six percent of 2004 U.S. emissions and 0.9 percent of global emissions. In California, the most common greenhouse gas is CO_2 from fossil fuel combustion, which constitutes approximately 81 percent of all greenhouse gas emissions.[41] The remainder of greenhouse gases only makes up a small percentage of the total: nitrous oxide constitutes 6.8 percent, methane 5.7 percent, high GWP gases 2.9 percent, and non-fossil fuel CO_2 emissions constitute 2.8 percent.[42] CO_2 emissions in California are mainly associated with fossil fuel consumption in the transportation sector (40.7 percent) with Electricity production (from both in-state and out-of-state sources) as the second-largest source (22.2 percent).[43] Industrial, agriculture & forestry, commercial, and residential activities comprise the balance of California's greenhouse gas emissions.

[37] Intergovernmental Panel on Climate Change, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.
[38] EPA, 2008. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. Office of Atmospheric Programs.
[39] CEC, 2006. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.
[40] CEC, 2006. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.
[41] CEC, 2006. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.
[42] CEC, 2006. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.
[43] CEC, 2006. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.

As part of the California Global Warming Solutions Act of 2006 (AB 32), discussed below, CARB is required to establish a statewide greenhouse gas emissions limit for 2020 equivalent to 1990 emissions. In addition, Executive Order S-3-05 sets the following statewide emissions targets: a reduction of greenhouse gas emissions to 2000 levels by 2010, a reduction of greenhouse gas emissions to 1990 levels by 2020, and a reduction of greenhouse gas emissions to 80 percent below 1990 levels by 2050. CARB estimates that California's annual emissions were equivalent to 427 Tg CO_2e in 1990 and 452 Tg CO_2e in 2000.[44] "The goal of AB 32 and S-3-05 is the significant reduction of future greenhouse gas emissions in a state that is expected to rapidly grow in both population and economic output."[45] Accordingly, to achieve the state's goals, there will have to be a significant reduction in per capita greenhouse gas emissions. While CEQA focuses on emissions associated with new development, other regulatory means will need to be implemented to address reductions in existing emissions.

Predicted Effects of Climate Change

Climate change could have a number of adverse effects. Although these effects would have global consequences, in most cases they would not disproportionately affect any one site or activity. In other words, many of the effects of climate change are not site-specific. Emission of greenhouse gases would contribute to the changes in the global climate, which would in turn, have a number of physical and environmental effects. A number of general effects, some of which may not occur in the Project Area, are discussed below.

Sea Level Rise and Flooding

The California Climate Change Center predicts that sea level in California will rise between 10.9 to 71.6 centimeters (cm) (0.36 to 2.3 feet) above existing mean sea level (msl) by 2099 as a result of climate change.[46] Therefore, projected climate change effects on sea level would increase the existing rate of sea level rise by 0.07 to 1.94 feet per century. When combined with astronomical tides, even a 1-foot increase in msl would result in the 100-year event high tide peak occurring at the 10-year event frequency.[47] In other words, the frequency of a current 100-year high tide (about 9.5 feet above current msl) would occur 10 times more often when sea levels increase to 1 foot above current msl.

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[44] CARB, 2007. Greenhouse Gas Emissions Inventory Database [1990 - 2004]. Accessed online August 5, 2008 at: http://www.arb.ca.gov/app/ghg/ghg_sector_data.php.

[45] CAPCOA, 2008. CEQA and Climate Change, p. 32.

[46] Cayan, D., P. Bromirski, K. Hayhoe, M. Tyree, M. Dettinger, and R. Flick. 2006. Projecting Future Sea Level: Table 3 Projected global sea level rise (SLR) (cm) for the SRES A1fi, A2, and B1 greenhouse gas emission scenarios. SLR for A2 and B1 scenarios is estimated by combining output recent global climate change model simulations with MAGICC projections for the ice melt component. SLR estimates for A1fi estimated from MAGICC based on A2 temperature changes scaled according to those in A1fi. A Report From the California Climate Change Center CEC-500-2005-2002-SF. p. 19

[47] Floyd, M., M. Anderson, M. Roos, R. Peterson, M. Perrone, and D. Todd. 2006. Chapter 2: Potential Impacts of Climate Change on California's Water Resources, Figure 2.32 Impact of One Foot Sea Level rise on the Relative Effect of Astronomical tides in the Delta. p. 2-53. In Medelin, J., J. Harou, M. Olivares, J. Lund, R. Howitt, S. Tanaka, M. Jenkins, K. Madani, and T. Zhu (Eds), Climate Warming and Water Supply Management In California: White Paper. A Report From Climate Change Center CEC-500-2005-195-SF

In the future, precipitation events are predicted to vary in terms of timing, intensity, and volume according to many climate change models.[48] Extreme storm events may occur with greater frequency.[49] The effect on peak runoff is not known because most climate change models have not used a temporal (or spatial) scale necessary to identify effects on peak flows, and existing precipitation/runoff models for assessing the effects of climate change do not yet adequately predict rainfall/runoff scenarios.[50] Changes in rainfall and runoff could affect flows in surface water bodies, causing increased flooding and runoff to the storm drain system. However, the effect that future changes to the hydrologic cycle may have on the Project Area is speculative and is not addressed further in this document.

Water Supply

The exact impacts on water supply from Climate Change are unknown however California has already seen some impacts from a change in climate. Within the last century, for example, the average spring snow pack on the Sierra Nevada range has decreased by 10%, a loss of approximately 1.5 million acre-feet. In the same time period, California's average temperature has risen by 1^0F, and the sea level has risen along the coast.[51] California Health and Safety Code Section 38501(a) recognizes that "[climate change] poses a serious threat to the economic well-being, public health, natural resources, and the environment of California," and notes, "the potential adverse impacts of [climate change] include…reduction in the quality and supply of water to the state from the Sierra snowpack." Additional impacts may occur in the form of drought, floods, water quality, and sea level rise. The following few paragraphs discuss each of these in more detail. However, because the full extent of future impacts from climate change are uncertain, their impacts on the proposed project cannot be quantified and are too speculative to determine their level of significance at this time.

Loss of Snowpack Storage

Most of the scientific models addressing climate change show that the primary effect on California's climate would be a reduced snow pack and a shift in stream-flow seasonality. In some locations, a higher percentage of the winter precipitation in the mountains would likely fall as rain rather than as snow, reducing the overall snowpack. As temperatures rise, snowmelt is expected to occur earlier in the year; as a result, peak runoff would likely come a month or so earlier. The end result of this would be that the State may not have sufficient water storage to capture the resulting early runoff, and so, absent construction of additional water storage projects, a portion of the current water supplies would be lost to the oceans, rather than be available for use in the State's water delivery systems.

[48] EPA, 2008. Climate Change Science: Precipitation and Storm Changes. Accessed January 16, 2009 at: http://www.epa.gov/climatechange/science/recentpsc.html

[49] EPA, 2008. Climate Change Science: Precipitation and Storm Changes. Accessed January 16, 2009 at: http://www.epa.gov/climatechange/science/recentpsc.html

[50] Anderson. M. 2006. Chapter 6: Climate Change Impacts on Flood Management p. 6-22 and 6-27. In Medelin, J., J. Harou, M. Olivares, J. Lund, R. Howitt, S. Tanaka, M. Jenkins, K. Madani, and T. Zhu (Eds), Climate Warming and Water Supply Management In California: White Paper. A Report From Climate Change Center CEC-500-2005-195-SF

[51] State of California The Resource Agency Department of Water Resources, 2008. Managing an Uncertain Future Climate Change Adaptation Strategies for California's Water.

Water Quality

Climate change could have adverse effects on water quality, which would in turn affect the beneficial uses (habitat, water supply, etc.) of surface water bodies and groundwater. The changes in precipitation discussed above could result in increased sedimentation, higher concentration of pollutants, higher dissolved oxygen levels, increased temperatures, and an increase in the amount of runoff constituents reaching surface water bodies. Sea level rise, discussed above, could result in the encroachment of saline water into freshwater bodies resulting in a reduction in available fresh water sources.

Drought

The frequency and intensity of droughts will be exacerbated by the warming of temperatures and the changes in rainfall and runoff patterns. Regions that rely heavily on surface water may be particularly vulnerable to changes in runoff patterns placing more demand on groundwater. Temperature increases will in turn increase rates of evaporation, thereby increasing the amount of water needed for irrigation purposes. Further there is the potential for forests to experience more frequent and intense fires subsequently causing changes in vegetation and a reduction in water supply and storage capacity of a healthy forest.

Ecosystems and Biodiversity

Climate change is expected to have effects on diverse types of ecosystems, from alpine to deep sea habitat. As temperatures and precipitation change, seasonal shifts in vegetation will occur, which could affect the distribution of associated flora and fauna species. As the range of species shifts, habitat fragmentation could occur, with acute impacts on the distribution of certain sensitive species. The IPCC states that "20 percent to 30 percent of species assessed may be at risk of extinction from climate change impacts within this century if global mean temperatures exceed 2 to 3 ^{0}C (3.6 to 5.4 ^{0}F) relative to pre-industrial levels." Shifts in existing biomes could also make ecosystems vulnerable to invasive species encroachment. Wildfires, which are an important control mechanism in many ecosystems, may become more severe and more frequent, making it difficult for native plant species to repeatedly re-germinate. In general terms, climate change is expected to put a number of stressors on ecosystems, with potentially catastrophic effects in biodiversity.

Human Health Effects

Climate change may increase the risk of vector-borne infectious diseases, particularly those found in tropical areas and spread by insects (malaria, dengue fever, yellow fever, and encephalitis). Cholera, which is associated with algal blooms, could also increase. While these health impacts would largely affect tropical areas in other parts of the world, effects of climate change would also be felt in California. Warming of the atmosphere would be expected to increase smog and particulate pollution, which could adversely affect individuals with heart and respiratory problems, such as asthma. Extreme heat events would also be expected to occur with more frequency, and could adversely affect the elderly, children, and the homeless. Finally, the water supply impacts and seasonal temperature variations expected as a

result of climate change could affect the viability of existing agricultural operations, making the food supply more vulnerable.

4.13.3 Regulatory Framework

In an effort to stabilize climate change and reduce impacts associated with climate change, international agreements, as well as federal and state actions were implemented. The regulatory setting related to GHG emissions includes the international, federal, state, regional, and local government agencies discussed below. These agencies work jointly, as well as individually, to address GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

International

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In November of 1998, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change agreement (Kyoto Protocol) with the goal of controlling GHG emissions. However, the US's signing of the Kyoto Protocol was never ratified. In 2001, the Bush Administration disengaged from the Kyoto Protocol in favor of studying potential domestic actions that might be made towards the reduction of GHG in the United States. The Kyoto Protocol Treaty is due to expire in 2012.[52]

In anticipation of providing an updated international treaty for the reduction of GHG emissions, representatives from 170 countries are met in Copenhagen in December 2009 to ratify an updated United Nations' Framework Convention on Climate Change agreement (Copenhagen Protocol). It is anticipated that the Copenhagen Protocol will be finalized and signed by representatives of the participating governments in 2010.

Federal

The United States Environmental Protection Agency (EPA) is responsible for implementing federal policy to address global climate change. The federal government administers a wide array of public-private partnerships to reduce GHG intensity generated by the United States. These programs focus on energy efficiency, renewable energy, methane, and other non-CO2 gases, agricultural practices, and implementation of technologies to achieve GHG reductions. The EPA implements several voluntary programs that substantially contribute to the reduction of GHG emissions.

In February 2002, the United States government announced a strategy to reduce the GHG intensity of the American economy by 18 percent over the 10-year period from 2002 to 2012. GHG intensity measures the ratio of GHG emissions to economic output. Meeting this commitment will prevent the release of more than 100 million metric tons of CO_2e emissions to the atmosphere (annually) by 2012 and more than 500 million metric tons (cumulatively) between 2002 and 2012. This policy consists of

[52] Fletcher, Susan R. 2005. Global Climate Change: The Kyoto Protocol. A CRS Report for Congress RL30692.

more than 50 voluntary programs and has three basic objectives: slowing the growth of emissions; strengthening science, technology, and institutions; and enhancing international cooperation. If in 2012 the United States is not on track towards meeting the reduction goal additional measures that may include a broad, market-based program and other incentives and voluntary measures will be introduced.[53]

In Massachusetts v. Environmental Protection Agency (Docket No. 05–1120), argued November 29, 2006, and decided April 2, 2007, the U.S. Supreme Court held that the EPA has authority to regulate greenhouse gases, and the EPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the EPA should be required to regulate CO_2 and other greenhouse gases as pollutants under Section 202(a)(1) of the federal Clean Air Act (CAA). The EPA has issued a Final Rule for mandatory reporting of GHG emissions in October of 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufactures of heavy-duty and off-road vehicles and vehicle engines, and requires annual reporting of emissions. The Final Rule was effective December 29th 2009 with data collection to begin on January 1st 2010 and the first annual reports due in March of 2011. This rule does not regulate the emission of GHGs it only requires the monitoring and reporting of greenhouse gas emissions for those sources above certain thresholds.[54] EPA adopted a Final Endangerment Finding for the six defined GHGs on December 7, 2009. The Endangerment Finding is required before EPA can regulate GHG emissions under Section 202(a)(1) of the CAA in fulfillment of the U.S. Supreme Court decision.

State

The California Air Resources Board is responsible for implementing state policy to address global climate change. The CARB, which is a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both the federal and State air pollution control programs within California. In this capacity, the CARB conducts research, sets California Ambient Air Quality Standards (CAAQS), compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the State Implementation Plan (SIP). In addition, the CARB establishes emission standards for motor vehicles sold in California, consumer products (e.g. hairspray, aerosol paints, and barbeque lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

California Assembly Bill 1493, enacted on July 22, 2002, required the CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. In 2005, the CARB submitted a "waiver" request to the EPA from a portion of the federal Clean Air Act in order to allow the State to set more stringent tailpipe emission standards for CO_2 and other GHG emissions from passenger vehicles and light duty trucks. In December 2007, EPA initially denied the request for a waiver. However, on June 30, 2009, the EPA reversed its initial denial and announced that it has granted the California Request to Reduce Vehicle Greenhouse Gas Emissions "waiver" request.

[53] Fletcher, Susan R. July 21, 2005. Global Climate Change: The Kyoto Protocol. A CRS Report for Congress RL30692.
[54] US EPA, October 30, 2009. 40 CFR Parts 86,87,89 et al. Mandatory Reporting of Greenhouse Gases; Final Rule.

Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, setting statewide targets for the reduction of California's greenhouse gas emissions. The Executive Order S-3-05 targets require that greenhouse gases be reduced to:

- 2000 levels by the year 2010
- 1990 levels by the year 2020
- 80 percent below 1990 levels by the year 2050

Executive Order S-3-05 directed the Secretary of the California EPA to report every two years on the State's progress toward meeting the Governor's GHG emission reduction targets. As a result of this executive order, the California Climate Action Team (CAT), led by the Secretary of the California EPA, was formed. The CAT is made up of representatives from a number of State agencies and was formed to implement global warming emission reduction programs and report on the progress made toward meeting State-wide targets established under the Executive Order. State agency members include the Business, Transportation and Housing Agency; Department of Food and Agriculture; Resources Agency; Air Resources Board; California Energy Commission; Public Utilities Commission; and Department of Water Resources. The CAT published its Climate Action Team Report to Governor Schwarzenegger and the Legislature in March 2006, in which it laid out 46 specific emission reduction strategies for reducing GHG emissions and reaching the targets established in the Executive Order.

Assembly Bill 32

Shortly after the issuance of Executive Order S-3-05, the California State Legislature adopted Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 requires the CARB to create a plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." AB 32 requires that GHG emissions be reduced to 1990 levels by 2020, the same 2020 threshold indicated in Executive Order S-3-05. CARB has also been tasked with developing Early Action Measures to reduce greenhouse gas emissions. Among the 44 adopted measures, is the development of local government greenhouse gas reduction guidance/protocols. As a member of the CAT, the CARB contributed to the 2006 Report to the Governor, and subsequently adopted the standards of that report as means of achieving the AB 32 target. Additional reductions information is provided on the agencies website and is being implemented by regional Air Quality Management Districts.

Under AB 32, CARB is required to establish a statewide greenhouse gas emissions cap for 2020 based on 1990 emissions. CARB estimates that California's annual emissions were equivalent to 427.0 Tg CO_2e in 1990 and 452.3 Tg CO_2e in 2000. Table 4.13-2 (California Greenhouse Gas Reductions Targets) shows quantified California statewide emissions targets based on the California Energy Commission's (CEC) 2007 Inventory of Greenhouse Gases and Sinks.

Table 4.13-2 California Greenhouse Gas Reductions Targets

Year[a]	Estimated California Population	Reduction Goal	Greenhouse Gas Target		Per Capita Target (short tons CO_2 per person)[b]
			(Tg CO_2e)	(million tons CO_2e)	
1990	29,828,000	N/A	427.0	470.7	15.8
2000	34,105,437	N/A	452.3	498.5	14.6
2010	39,135,676	GHG emissions at or below 2000 levels[c]	452.3	498.5	12.7
2020	44,135,923	GHG emissions at or below 1990 levels	427.0	470.7	10.7
2050	59,507,876	GHG emissions 80% of 1990 levels[d]	85.4	94.1	1.6

SOURCE: Population data are from California Department of Finance, 2007; greenhouse gas targets are derived from CARB, 2007. Greenhouse Gas Emissions Inventory Summary [1990 - 2004].

Target years specified in Executive Order S-3-05 and/or AB 32. 1990 and 2000 data are provided as a baseline.

Calculated by dividing the Greenhouse Gas Target by the projected population for a given target year. 1 teragram (Tg) = 1 million metric tons = 1.1023 million short tons CO_2e.

Based on 2004 estimate.

Calculated by multiplying 427.0 x 80%.

CO_2e = carbon dioxide equivalent

Senate Bill 97

An additional bill related to AB 32, Senate Bill 97 (SB 97), required that by July 1, 2009 the California Office of Planning and Research (OPR) prepare, develop, and transmit to the Resources Agency (recently renamed the Natural Resources Agency) guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by the California Environmental Quality Act (CEQA), including but not limited to, effects associated with transportation or energy consumption. On April 13, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the state CEQA Guidelines for greenhouse gas emissions, as required by Senate Bill 97. The Natural Resources Agency transmitted the Adopted Amendments and the entire rulemaking file to the Office of Administrative Law (OAL) on December 31, 2009. The OAL has 30 working days to review the Adopted Amendments and the Natural Resources Agency's rulemaking file. The Adopted Amendments will become effective 30 days after OAL completes its review and submits them to the Secretary of State for inclusion in the California Code of Regulations.

CEQA Guidelines

In response to SB 97 OPR released draft CEQA guideline amendments for GHG emissions to the Natural Resources Agency on April 14, 2009. On December 30, 2009, the Natural Resources Agency adopted the CEQA Guidelines Amendments addressing greenhouse gas emissions. OPR does not identify a threshold of significance for GHG emissions, nor has it prescribed assessment methodologies or specific mitigation measures. The amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion granted by CEQA to lead agencies in making their own determinations based on substantial evidence. The amendments also encourage public agencies to make use of programmatic mitigation plans and programs from which to tier when they perform individual project analyses.

The technical advisory suggests three components for CEQA disclosure: quantification of GHG emissions from a project's construction and operation, determination of significance of the project's impact to climate change, and if the project is found to be significant, the identification of suitable alternatives and mitigation measures. The analysis contained herein follows this guidance.

The California Air Pollution Control Officers Association (CAPCOA) released a white paper, entitled *CEQA and Climate Change*, in January 2008. The white paper contains the disclaimer that it is "intended as a resource, not a guidance document," and examines various threshold approaches available to air districts and lead agencies for determining whether GHG emissions are significant.

Senate Bill 375 (SB 375)

Signed in September 2008 (Chapter 728, Statutes of 2008), SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) such as the Southern California Council of Governments (SCAG) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS), as defined, in their upcoming, updated regional transportation plans (RTPs) for the purpose of reducing greenhouse gas emissions. SB 375 also aligns planning for transportation and housing, and creates specified incentives for the implementation of the strategies. ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects will not be eligible for funding programmed after January 1, 2012.

This law also extends the minimum time period for the regional housing needs allocation cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the regional transportation plan (and associated SCS or APS). However, new provisions of CEQA would incentivize (through streamlining and other provisions) qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

CARB prepared a Scoping Plan to develop programs and measures to address the remaining 107 million tons of CO_2e in order to reach the total of 173 million tons by the year 2020. The Scoping Plan was submitted to CARB in November of 2008 and was approved by CARB on December 11, 2008. The Scoping Plan contains the main strategies California will implement to reduce CO_2e emissions by 169 MMT, or approximately 30 percent, from the state's projected 2020 emissions level of 596 MMT of CO_2e under a business-as-usual scenario. (This is a reduction of 42 MMT CO_2e, or almost 10 percent, from 2002–2004 average emissions, but requires the reductions in the face of population and economic growth through 2020). The Scoping Plan also breaks down the amount of GHG emissions reductions ARB recommends for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- Improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e)
- The Low-Carbon Fuel Standard (15.0 MMT CO_2e)
- Energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e)
- A renewable portfolio standard for electricity production (21.3 MMT CO_2e)

The Scoping Plan identifies the role of local governments with the following language:

> Local Government Targets: In recognition of the critical role local governments will play in the successful implementation of AB 32, ARB added a section describing this role. In addition, ARB recommended a greenhouse gas reduction goal for local governments of 15 percent below today's levels by 2020 to ensure that their municipal and community-wide emissions match the State's reduction target.[55]

Title 24

Title 24, Part 6 of the California Code of Regulations (CCR) (Title 24), Energy Efficient Standards for Residential and Nonresidential Buildings, was adopted in 1978 by the CEC in response to a legislative mandate to reduce California's energy consumption. "Title 24" requires developers to incorporate energy conserving features into new construction. Although it was not originally intended as a climate change policy, by reducing California's energy consumption, Title 24 has become a de facto means of reducing California's greenhouse gas emissions. Energy efficient buildings require less electricity, which results in fewer greenhouse gas emissions.

Regional

The South Coast Air Quality Management District (SCAQMD) is the agency principally responsible for comprehensive air pollution control in the Orange County area. In order to provide GHG emission guidance to the local jurisdictions within the South Coast Air Basin, the SCAQMD has organized a Working Group to develop GHG emission analysis guidance and thresholds.

SCAQMD released a draft guidance document regarding interim CEQA GHG significance thresholds in October 2008. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where the SCAQMD is lead agency. SCAQMD proposed a tiered approach, whereby the level of detail and refinement needed to determine significance increases with a project's total GHG emissions. The tiered approach defines projects that are exempt under CEQA and projects that are within a GHG Reduction Plan as less than significant.

[55] EPA, Evaluation of Greenhouse Gas Emissions and Reduction Strategies Related to Waste Management by Local Government, http://www.epa.gov/ttn/chief/conference/ei18/session7/groth.pdf.

4.13.4 Project Impacts and Mitigation

Analytic Method

This analysis provides an estimated inventory of GHG emissions attributable to the Project at buildout; calculates GHG emissions; and determines the significance of the Project's incremental contribution to GHG emissions on global climate change impacts based upon the criteria above. The calculations use the California Climate Action Registry General Reporting Protocol, version 3.0 (January 2009).

Greenhouse Gas Emission Sources

The Project would result in GHG emissions from construction and from annual direct and indirect emissions from the operation of the development. Total GHG emissions would be the sum of emissions from both direct and indirect sources. Direct sources include mobile sources such as motor vehicles, and stationary sources such as building cooling and heating equipment. Indirect sources include emissions related to electric generation for power consumed by the Project, or from energy consumed for operation of water and wastewater systems, or collection and disposal of solid waste for the Project.

Direct Source Emissions are determined based on sources as follows:

- Emissions from mobile sources are associated with vehicle trips with respect to type and distance for each land use as well as emissions associated with the operation of construction equipment.
- Emissions from stationary sources are determined the usage of natural gas for heating/cooling, cooking; and manufacturing.
- Area source emissions are associated with landscape equipment exhaust; and emissions from hearths including gas fireplaces, wood-burning fireplaces, and wood-burning stoves.

Indirect Sources Emissions are determined based on source as follows:

- Consumption by land uses or the generation of electricity from power plants.
- Potable water usage is reported as the annual emissions from electrical demand on pumps and equipment needed for treatment and transport of potable water.
- Solid waste is reported as the sum of annual emissions from solid waste disposal, treatment, transportation, and fugitive emissions of methane during the life-cycle of the solid waste facilities.
- Wastewater usage is reported as the annual emissions from electrical demand on pumps and equipment needed for wastewater transport, treatment, and disposal.

Thresholds of Significance

The Project would not generate enough GHG emissions to influence global climate change on its own. The Project would, however, contribute to potential climate change through its incremental contribution (positive or negative) of GHG emissions that, when combined with the cumulative increase of all other anthropogenic sources of GHGs, would impact global climate change. Therefore, global climate change

is a cumulative impact and the Project's participation in this cumulative impact is through its incremental contribution of GHG emissions. CEQA Guidelines Section 15064(h)(1) , "cumulatively considerable" is defined to mean "that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."

CEQA Guidelines do not provide numeric or qualitative thresholds of significance for GHG. However, AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020 and 80 percent below 1990 levels by 2050 The 2020 reduction target equates to a decrease of approximately 30 percent below the Business-As-Usual GHG emissions. Business-as-usual is defined as the emissions that would be expected to occur in the absence of any GHG reduction measures. Thus, the following thresholds will be used:

- Generate greenhouse gas emission, either directly or indirectly, that may have a significant impact on the environment.
- Generate greenhouse gas emissions, conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gas

Under CEQA, in order to determine whether or not a proposed project would cause a significant impact on the environment, the impact of a project must be determined by examining the types and levels of GHG emissions generated and comparing those to some threshold. In accordance with CEQA Guidelines (Section 15064 (h)(3)):

> A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem (e.g., water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency …

In determining whether or not the project will "generate GHG emissions, either directly or indirectly, that may have a significant effect on the environment," the AB 32 30 percent below Business-As-Usual threshold will be used.

Environmental Analysis

For each potential impact associated with the proposed project, a level of significance is determined and is reported in the impact statement. Conclusions of significance are defined as follows: significant impact (S), potentially significant impact (PS), less than significant impact (LTS), or no impact (NI). For each impact identified as being significant (S) or potentially significant (PS), this EIR provides mitigation measures to reduce, eliminate, or avoid the adverse effect. If the mitigation measures would reduce the impact to less-than-significant (LTS) level successfully, this is stated in this EIR. If the mitigation measures would not diminish significant or potentially significant impacts to a less-than-significant level, the impacts are classified as "significant unavoidable impacts (SU)." The impacts of the mixed-use retail

development are evaluated in this EIR on a programmatic level; following the submittal of a project-specific development proposal for the mixed-use retail development, additional environmental analysis would be required.

Effects Found to Have a Significant Impact

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

Impact 4.13-1 **Long-term cumulative development pursuant to the Transit Zoning Code at full build-out would result in significant localized air quality impacts for operational level emissions. As a whole, this impact is significant for operational emissions due to the size of the Transit Zoning Code (SD 84A and SD 84B) area. Implementation of mitigation measures may reduce impacts created by the long-term cumulative development and attendant emissions; however, impacts cannot be mitigated to a level of less than significant. Therefore this impact remains *significant and unavoidable*.**

An individual project cannot generate enough GHG emissions to influence global climate change. The project participates in this potential impact by its incremental contribution combined with the cumulative increase of all other sources of GHGs, which when taken together form global climate change impacts. The following discussion reviews each of the GHGs and the Project's potential generation of these gases.

Carbon Dioxide

The Project's main contribution to GHGs is carbon dioxide. The Project will generate emissions of carbon dioxide primarily in the form of vehicle exhaust and in the consumption of natural gas for heating. Carbon dioxide emissions from vehicles were calculated using URBEMIS2007 assumptions and EMFAC2007 emission factors that are used in URBEMIS2007. The "Potential Net Development" carbon dioxide Unmitigated emissions are shown in Table 4.13-3 (Potential Net Development, Unmitigated Carbon Dioxide Emissions).

Table 4.13-3 Potential Net Development, Unmitigated Carbon Dioxide Emissions

Emission Source	*Carbon Dioxide Emissions (tons per year)*	*Global Warming Potential (GWP) (tons per year)*
Construction period Emissions	16.94	16.94
Vehicles	82,244.08	82,244.08
Natural Gas Combustion	10,633.33	10,633.33
Landscape Equipment	6.36	6.36
Electric Use	10,273.82	10,273.82
Potable Water Treatment	4.58	4.58
Wastewater Treatment	2.29	2.29
Solid Waste Transport/Disposal	37.70	37.70
Total Emissions	***103,219.10***	***103,219.10***

Methane

The Project will generate some methane gas. Methane was estimated using EPA emission factors for on-road vehicles. The "Potential Net Development" Unmitigated emissions methane emissions are shown in Table 4.13-4 (Potential Net Development, Unmitigated Methane Emissions).

Table 4.13-4 Potential Net Development, Unmitigated Methane Emissions

Emission Source	Methane Emissions (tons per year)	Global Warming Potential (tons per year)
Construction Period Emissions	0.00	0.05
Vehicles	22.67	476.07
Natural Gas Combustion	1.50	31.59
Landscape Equipment	0.00	0.03
Electric Use	0.10	2.00
Potable Water Treatment	1.40	29.30
Wastewater Treatment	0.781253	16.41
Solid Waste Transport and Disposal	16.97	356.42
Total Emissions	***43.42***	***911.87***

Nitrous Oxide

Nitrous oxide was estimated using EPA emission factors for on-road vehicles (EPA 2004). The "Potential Net Development" Unmitigated emissions nitrous emissions are shown in Table 4.13-5 (Potential Net Development, Unmitigated Nitrous Oxide Emissions).

Table 4.13-5 Potential Net Development, Unmitigated Nitrous Oxide Emissions

Emission Source	Nitrous Oxide Emissions (tons per year)	Global Warming Potential (GWP) (tons per year)
Construction Period Emissions	0.00006	0.02
Vehicles	10.51	3,259.22
Natural Gas Combustion	0.03	7.90
Landscape Equipment	0.00074	0.23
Electric Use	0.05	16.28
Potable Water Treatment	0.77	238.83
Wastewater Treatment	0.43	133.75
Solid Waste Transport/Disposal	2.85	883.52
Total Emissions	***14.64***	***4,539.74***

The Project as a whole is significant for construction and operational emissions due to the size of the Transit Zoning Code (SD 84A and SD 84B) area. With programmatic mitigation incorporated at the individual component level, the components themselves may be less than significant on a site-by-site

basis, but will be required to do individual air quality impact analyses to determine their independent significance levels.

Greenhouse Gas Mitigation Measures

Construction Period

MM4.13-1 *All diesel fueled construction equipment shall be classified EPA Tier II or better emission efficiencies.*

MM4.13-2 *All construction equipment shall be shut off when not in use and shall not idle for more than five minutes, unless actively engaged in construction activities.*

MM4.13-3 *Queuing of trucks on- and offsite shall be limited to periods when absolutely necessitated by grading or construction activities.*

MM4.13-4 *All on-road construction trucks and other vehicles greater than 10,000 pounds shall be shut off when not in use and shall not idle for more than 5 minutes.*

MM4.13-5 *To the extent feasible, all diesel- and gasoline-powered construction equipment shall be replaced with equivalent electric equipment.*

MM4.13-6 *Project plans and specifications shall include policies and procedures for the reuse and recycling of construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).*

MM4.13-7 *Project plans and specifications shall include education for construction workers about reducing waste and using available recycling services.*

Long-Term Operational

MM4.13-8 *Prior to issuance of a building permit, the applicant shall demonstrate that the design of the proposed buildings or structures meets or exceeds the most recent Title 24 requirements (Title 24, Part 6 of the California Code of Regulations; Energy Efficiency Standards for Residential and Non Residential Buildings; Cool Roof Coatings performance standards), subject to review by the City Building Official. Documentation of compliance with this measure shall be provided to the Planning and Building Agency and Building Official for review and approval prior to issuance of the permit. Installation of the identified design features or equipment will be confirmed by the City Building Official prior to certificate of occupancy. The following design features should be considered by the applicant as a way to achieve Title 24 compliance in excess of the minimum requirement:*

- *Increase in 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*
- *Incorporate dual-paned or other energy efficient windows*
- *Incorporate energy efficient space heating and cooling equipment*
- *Incorporate energy efficient light fixtures*
- *Incorporate energy efficient appliances*

- *Incorporate energy efficient domestic hot water systems*
- *Incorporate solar panels into the electrical system*
- *Incorporate cool roofs/light-colored roofing*
- *Or other measures that will increase the energy efficiency of building envelope in a manner that when combined with the other options listed above exceeds current Title 24 Standards (Title 24, Part 6 of the California Code of Regulations; Energy Efficiency Standards for Residential and Non Residential Buildings, as amended September 11, 2008; Cool Roof Coatings performance standards as amended September 11, 2006) by a minimum of 20 percent*

MM4.13-9 *Prior to issuance of a building permit, applicants for individual projects shall provide a landscape plan that includes shade trees around main buildings, particularly along southern elevations where practical, and will not interfere with loading dock locations or other operational constraints. Documentation of compliance with this measure shall be provided to the Planning and Building Agency for review and approval.*

MM4.13-10 *All showerheads, lavatory faucets, and sink faucets within the residential units, and where feasible within non-residential developments, shall comply with the California Energy Conservation flow rate standards.*

MM4.13-11 *Low-flush toilets shall be installed within all Congregate Care units as specified in California State Health and Safety Code Section 17921.3.*

MM4.13-12 *Project designers should consider design features to incorporate light-colored roofing materials that will deflect heat away from the building and conserve energy.*

MM4.13-13 *Landscape designers shall ensure that landscaping of common areas for Industrial/Commercial projects uses drought-tolerant and smog-tolerant trees, shrubs, and groundcover to ensure long-term viability and conserve water and energy.*

MM4.13-14 *Landscape designers shall ensure that the landscape plan for Industrial/Commercial projects includes drought resistant trees, shrubs, and groundcover within the parking lot and perimeter.*

MM4.13-15 *Individual project applicants shall ensure that designs for Industrial/Commercial projects include all illumination elements to have controls to allow selective use as an energy conservation measure.*

MM4.13-16 *The applicant for Industrial/Commercial projects should promote ride sharing programs such as, but not necessarily including, publishing ride sharing information for all of the tenants, designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading and waiting areas for ride sharing vehicles, and providing a website or message board for coordinating rides. Prior to issuance of a building permit, the applicant shall demonstrate that measures have been included to provide adequate bicycle parking near building entrances to promote cyclist safety, security, and convenience pursuant to SAMC Chapter 41 regarding bicycle parking standards and Chapter 16 of the Santa Ana Citywide Design Guidelines regarding Bikeway Support Facilities Guidelines . Documentation of compliance with this measure shall be provided to the City Building Official for review and approval. Installation of the identified design features or equipment will be confirmed by the City Building Official prior to issuance of certificate of occupancy.*

MM4.13-17 *Prior to issuance of any certificate of occupancy, the applicant shall demonstrate that all Multi-family/Industrial/Commercial projects' interior building lighting supports the use of compact fluorescent light bulbs or equivalently efficient lighting to the satisfaction of the Building Official.*

MM4.13-18 *Applicants for Multi-family/Industrial/Commercial projects shall consider providing preferential parking spaces for ultra-low emission vehicles and alternative fueled vehicles to encourage the use of alternative fuels and ultra-low emission vehicles.*

MM4.13-19 *Prior to issuance of a building permit, the applicant shall demonstrate that the proposed Multi-family/ Industrial/Commercial uses building or structure designs incorporate exterior storage areas for recyclables and green waste and adequate recycling containers located in public/common areas pursuant to the adopted standards. Documentation of compliance with this measure shall be provided to the Planning and Building Agency for review and approval. Installation of the identified design features or equipment will be confirmed by the City Building Official prior to issuance of certificate of occupancy.*

MM4.13-20 *All common area irrigation areas for Multi-family/Industrial/Commercial projects shall consider systems that are capable of being operated by a computerized irrigation system which includes an onsite weather station/ET gage capable of reading current weather data and making automatic adjustments to independent run times for each irrigation valve based on changes in temperature, solar radiation, relative humidity, rain, and wind. In addition, the computerized irrigation system shall also consider the ability to be equipped with flow-sensing capabilities, thus automatically shutting down the irrigation system in the event of a mainline break or broken head. These features will assist in conserving water, eliminating the potential of slope failure due to mainline breaks, and eliminating over-watering and flooding due to pipe and/or head breaks.*

MM4.13-21 *Consideration of installation of solar roofs on homes and businesses to offset the increasing demand for energy and natural gas.*

MM4.13-22 *Project applicants shall, where feasible, incorporate passive solar design features into the buildings, which may include roof overhangs or canopies that block summer shade, but that allow winter sun, from penetrating south facing windows.*

MM4.13-23 *Use Energy Efficient Roofing Materials. All roofing materials used in commercial/retail buildings at the Mixed-Use Retail Development shall be Energy Star® certified. All roof products shall also be certified to meet American Society for Testing and Materials (ASTM) high emissivity requirements.*

MM4.13-24 *All commercial/industrial projects shall, where feasible, include up to 10% renewable energy sources within the project.*

The "Potential Net Development" emissions from carbon dioxide, methane, and nitrous oxide with the incorporation of the above mitigation measures are shown in Table 4.13-6 (Potential Net Development, Mitigated Carbon Dioxide Emissions), Table 4.13-7 (Potential Net Development, Mitigated Methane Emissions), and Table 4.13-8 (Potential Net Development, Mitigated Nitrous Oxide Emissions), respectively.

Table 4.13-6 Potential Net Development, Mitigated Carbon Dioxide Emissions		
Emission Source	*Carbon Dioxide Emissions (tons per year)*	*Global Warming Potential (GWP) (tons per year)*
Construction period Emissions	16.94	16.94
Vehicles	77,601.49	77,601.49
Natural Gas Combustion	8,506.67	8,506.67
Landscape Equipment	0.00	0.00
Electric Use	7,948.17	7,948.17
Potable Water Treatment	2.43	2.43
Wastewater Treatment	1.24	1.24
Solid Waste Transport/Disposal	18.92	18.92
Total Emissions	***94,095.86***	***94,095.86***

Table 4.13-7 Potential Net Development, Mitigated Methane Emissions		
Emission Source	*Methane Emissions (tons per year)*	*Global Warming Potential (tons per year)*
Construction Period Emissions	0.00225	0.05
Vehicles	21.40	449.40
Natural Gas Combustion	1.23	25.86
Landscape Equipment	0.00	0.03
Electric Use	0.09	1.92
Potable Water Treatment	1.10	23.20
Wastewater Treatment	0.5200242	10.92
Solid Waste Transport and Disposal	8.61	180.90
Total Emissions	***32.97***	***692.27***

Table 4.13-8 Potential Net Development, Mitigated Nitrous Oxide Emissions		
Emission Source	*Nitrous Oxide Emissions (tons per year)*	*Global Warming Potential (GWP) (tons per year)*
Construction Period Emissions	0.00006	0.02
Vehicles	9.91	3,072.10
Natural Gas Combustion	0.02	6.47
Landscape Equipment	0.00074	0.23
Electric Use	0.04	13.07
Potable Water Treatment	0.52	161.04
Wastewater Treatment	0.27	84.30
Solid Waste Transport/Disposal	0.93	288.38
Total Emissions	***11.70***	***3,625.61***

Summary

AB 32, the California Global Warming Solutions Act of 2006, requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020 and 80 percent below 1990 levels by 2050 The 2020 reduction target equates to a decrease of approximately 30 percent below the Business as Usual GHG emissions.

Long-term cumulative development, and attendant construction activity, pursuant to the Transit Zoning Code at full build-out would generate GHG emissions during the construction period from operation of construction equipment. While implementation of mitigation measures MM4.13-1 through MM4.13-7 would reduce construction-related emissions, they may not reduce these emissions to levels below the SCAQMD thresholds as the amount of emissions generated for each project would vary depending on its size, the land area that would need to be disturbed during construction, and the length of the construction schedule, as well as the number of developments that could be constructed concurrently as part of the Transit Zoning Code (SD 84A and SD 84B). Under these conditions, no further feasible mitigation measures are available and this impact would be considered ***significant and unavoidable***.

Long-term cumulative development pursuant to the Transit Zoning Code at full build-out would result in significant air quality impacts for operational level emissions. As a zoning document, the Transit Zoning Code does not incorporate specific construction details or requirements that would specifically reduce emissions from the construction and operation of individual projects, therefore the unmitigated project emissions would be equal to the business-as-usual development. The "Potential Net Development" Unmitigated and Mitigated emissions are summarized in Table 4.13-9 (Potential Net Development, Global Warming Potential). The Transit Zoning Code may implement a programmatic level control over the individual project components, such that the individual components must implement all feasible mitigation in order to reduce project specific emissions to 30% below business-as-usual. Programmatic mitigation measures will be incorporated into the individual components of the Transit Zoning Code (SD 84A and SD 84B) as they are being prepared. It should be noted that the project is an in-fill project in a heavily urbanized section of the City. It includes planning components to encourage Transit-Oriented Development around an existing regional transit center. Furthermore, the project site is expected to contain a future alignment of the Santa Ana Fixed-Guideway project which will offer public transit from the SARTC to the city of Garden Grove and beyond. While the project still is found to have a significant impact, it is expected that it would cause a lesser impact than typical automobile-oriented development. Nonetheless, even with the incorporation of mitigation measures MM4.13-8 through MM4.13-24, impacts remain ***significant and unavoidable***.

Table 4.13-9 Potential Net Development, Global Warming Potential			
Emission Sources	*Unmitigated Global Warming Potential (GWP) (tons per year)*	*Mitigated GWP of Greenhouse Gases (tons per year)*	*Percent Reduction from Unmitigated Emissions*
Construction Period Emissions	17.00	17.00	0.00%
Vehicles	85,979.37	81,122.99	5.65%
Natural Gas Combustion	10,672.83	8,539.00	19.99%
Landscape Equipment	6.62	0.26	96.03%
Electric Use	10,292.09	7,963.15	22.63%
Potable Water Treatment	272.71	186.68	31.55%
Wastewater Treatment	152.44	96.47	36.72%
Solid Waste Transport/Disposal	28.46	488.20	61.79%
Total Operational Emissions	***108,670.71***	***98,413.74***	***9.44%***

Threshold	Generate greenhouse gas emissions, conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gas.

Impact 4.13-2 **Long-term cumulative development pursuant to the Transit Zoning Code at full build-out has the potential to conflict with AB 32. The Project as a whole is significant for operational emissions due to the size of the Transit Zoning Code (SD 84A and SD 84B) area. Implementation of mitigation measures may reduce impacts from the long-term cumulative development resulting from the Transit Zoning Code, however, due to the fact that, with the exception of the Developer project, project specific details are unknown resulting in a conservative finding that impacts cannot be mitigated to a level of less than significant. Therefore this impact remains *significant and unavoidable*.**

The primary objective of the Transit Zoning Code is to provide zoning for the integration of new infill development into existing neighborhoods, to allow for the reuse of existing structures, and to provide a transit-supportive, pedestrian-oriented development framework to support the addition of new transit infrastructure. As shown in Impact 4.13-1, the impacts from the proposed project development are significant with respect to the emission of GHGs. AB 32, the California Global Warming Solutions Act of 2006, requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020 and 80 percent below 1990 levels by 2050. The 2020 reduction target equates to a decrease of approximately 30 percent below the current GHG emissions. With programmatic mitigation incorporated at the individual project level, the projects themselves may be less than significant on a site-by-site basis, but on a long-term cumulative basis could exceed these thresholds. Therefore long-term cumulative development pursuant to the Transit Zoning Code at full build-out results in ***significant and unavoidable impacts*** that cannot be further mitigated.

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