4.6 GREENHOUSE GAS EMISSIONS

This chapter describes the regulatory framework and existing conditions related to greenhouse gas (GHG) emissions, the potential for future development that could occur by adopting and implementing the proposed Specific Plan Update, and approval and development of the proposed Transit-Oriented Developments (TOD) #1 and #2 (together referred to as the "proposed Project") to cumulatively contribute to GHG emissions, and the recommended mitigation measures for identified significant impacts. Because no single project is large enough individually to result in a measurable increase in global concentrations of GHG emissions, global warming impacts of a project are considered on a cumulative basis.

This section is based on the methodology recommended by the Bay Area Air Quality Management District (BAAQMD). Specific plans are evaluated using BAAQMD's project-level review criteria based on the preliminary information available.[1] Transportation sector emissions are based on trip generation and average vehicle miles traveled (VMT) provided by Fehr & Peers. The GHG emissions modeling are included in Appendix D, Air Quality and Greenhouse Gas Modeling, of this Draft EIR.

4.6.1 ENVIRONMENTAL SETTING

Greenhouse Gases and Climate Change

Scientists have concluded that human activities are contributing to global climate change by adding large amounts of heat-trapping gases, known as GHGs, to the atmosphere. The primary source of these GHGs is fossil fuel use. The Intergovernmental Panel on Climate Change (IPCC) has identified four major GHGs—water vapor, carbon dioxide (CO_2), methane (CH_4), and ozone (O_3)—that are the likely cause of an increase in global average temperatures observed in the 20th and 21st centuries. Other GHGs identified by the IPCC that contribute to global warming to a lesser extent are nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons, perfluorocarbons, and chlorofluorocarbons.[2,3,4] The major GHGs are briefly described below.

- **Carbon dioxide (CO_2)** enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and respiration, and also as a result of other chemical reactions (e.g.

[1] Pursuant to BAAQMD's CEQA Guidelines, only general plans are evaluated using BAAQMD's plan-level guidance.
[2] Water vapor (H_2O) is the strongest GHG and the most variable in its phases (vapor, cloud droplets, ice crystals). However, water vapor is not considered a pollutant, but part of the feedback loop rather than a primary cause of change.
[3] Black carbon contributes to climate change both directly, by absorbing sunlight, and indirectly, by depositing on snow (making it melt faster) and by interacting with clouds and affecting cloud formation. Black carbon is the most strongly light-absorbing component of particulate matter (PM) emitted from burning fuels such as coal, diesel, and biomass. Reducing black carbon emissions globally can have immediate economic, climate, and public health benefits. According to the California Air Resources Board, California has been an international leader in reducing emissions of black carbon, with close to 95 percent control expected by 2020 due to existing programs that target reducing PM from diesel engines and burning activities . However, State and national GHG inventories do not yet include black carbon due to ongoing work resolving the precise global warming potential of black carbon. Guidance for CEQA documents does not yet include black carbon.
[4] Intergovernmental Panel on Climate Change, Third Assessment Report: Climate Change 2001*,* New York: Cambridge University Press.

manufacture of cement). Carbon dioxide is removed from the atmosphere (i.e. sequestered) when it is absorbed by plants as part of the biological carbon cycle.

- **Methane (CH_4)** is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock, and other agricultural practices, and from the decay of organic waste in landfills and water treatment facilities.
- **Nitrous oxide (N_2O)** is emitted during agricultural and industrial activities as well as during the combustion of fossil fuels and solid waste.
- **Fluorinated gases** are synthetic, strong GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances. These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as high global-warming-potential (GWP) gases. Fluorinated gases include the following:
    - **Chlorofluorocarbons (CFCs)** are GHGs covered under the 1987 Montreal Protocol and used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Since they are not destroyed in the lower atmosphere (i.e. troposphere), CFCs drift into the upper atmosphere where, given suitable conditions, they break down the ozone layer. These gases are therefore being replaced by other compounds that are GHGs covered under the Kyoto Protocol.
    - **Perfluorocarbons (PFCs)** are a group of human-made chemicals composed of carbon and fluorine only. These chemicals (predominantly perfluoromethane [CF_4] and perfluoroethane [C_2F_6]) were introduced as alternatives, along with HFCs, to ozone-depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they have a high GWP.
    - **Sulfur Hexafluoride (SF_6)** is a colorless gas that is soluble in alcohol and ether, and slightly soluble in water. SF_6 is a strong GHG used primarily in electrical transmission and distribution systems as an insulator.
    - **Hydrochlorofluorocarbons (HCFCs)** contain hydrogen, fluorine, chlorine, and carbon atoms. Although they are ozone-depleting substances, they are less potent than CFCs. They have been introduced as temporary replacements for CFCs.
    - **Hydrofluorocarbons (HFCs)** contain only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone-depleting substances to serve many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They do not significantly deplete the stratospheric ozone layer, but they are strong GHGs.[5,6]

The GWPs of GHGs are dependent on the lifetime or persistence of the gas molecule in the atmosphere. Some GHGs have a stronger greenhouse effect than others. As noted above, they are referred to as high GWP gases. The GWP of GHG emissions are shown in Table 4.6-1. The GWP is used to convert GHGs to CO_2-equivalence (CO_2e) to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and

[5] United States Environmental Protection Agency, Greenhouse Gas Emissions, 2012, http://www.epa.gov/climatechange/ghgemissions/gases.html, accessed on September 24, 2014.
[6] Intergovernmental Panel on Climate Change, Third Assessment Report: Climate Change 2001, New York: Cambridge University Press.

contribute to the greenhouse effect. For example, under IPCC's Second Assessment Report GWP value for CH_4, which is 21; a project that generates 10 metric tons (MT) of CH_4 would be equivalent to 210 MT of CO_2.[7]

California's Greenhouse Gas Sources and Relative Contribution

California is the tenth largest GHG emitter in the world and the second largest emitter of GHG in the United States, surpassed only by Texas; however, California also has over 12 million more people than the state of Texas.[8,9] Because of more stringent air emission regulations, in 2001 California ranked fourth lowest in carbon emissions per capita and fifth lowest among states in CO_2 emissions from fossil fuel consumption per unit of Gross State Product (total economic output of goods and services).[10]

The California Air Resources Board (CARB)'s last update to the statewide GHG emissions inventory that used the Second Assessment Report GWPs was conducted in 2012 for year 2009 GHG emissions.[11,12] In 2009, California produced 457 million metric tons (MMT) of CO_2e GHG emissions. California's transportation sector is the single largest generator of GHG emissions, producing 37.9 percent of the State's total emissions. Electricity consumption is the second largest source, producing 22.7 percent. Industrial activities are California's third largest source of GHG emissions at 17.8 percent.[13,14]

[7] CO_2-equivalence is used to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. The global warming potential of a GHG is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.
[8] California Energy Commission, Climate Change Emissions Estimates from Bemis, Gerry and Jennifer Allen, Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2002 Update, California Energy Commission Staff Paper CEC-600-2005-025, Sacramento, California, June 2005.
[9] United States Energy Information Administration, Rankings: Total Carbon Dioxide Emissions 2011, http://www.eia.gov/state/rankings/?sid=US&CFID=16614878&CFTOKEN=c9e715a2d7eea2be-87707F06-237D-DA68-2480975A3D95A7AF&jsessionid=8430fb08420360b6652d711d4e77303802c2#/series/226, accessed August 2014.
[10] California Energy Commission, 2006. *Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004,* Report CEC-600-2006-013-SF, December.
[11] Methodology for determining the statewide GHG inventory is not the same as the methodology used to determine statewide GHG emissions under Assembly Bill 32 (AB 32) (2006).
[12] As noted in Table 4.6-1, BAAQMD uses the GWP values from IPCCs Second Assessment Report that was published in 2001. The IPCC has published updated GWP values in subsequent Assessment Reports, but BAAQMD relies on the Second Assessment Report GWPs in order to maintain consistency in GHG emissions modeling. Therefore, the GHG analysis in this section relies on the GWP values from the Second Assessment Report, and therefore reports the latest California emissions that use these same GWP values.
[13] CO_2-equivalence is used to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. The global warming potential of a GHG is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.
[14] California Air Resources Board, California Greenhouse Gas Inventory for 2000–2009: By Category as Defined by the Scoping Plan, April 2012.

TABLE 4.6-1 GHG EMISSIONS AND THEIR RELATIVE GLOBAL WARMING POTENTIAL COMPARED TO CO_2

GHGs	Atmospheric Lifetime (Years)	Second Assessment Report Global Warming Potential Relative to CO_2[a]	Fourth Assessment Report Global Warming Potential Relative to CO_2[b]
Carbon Dioxide (CO_2)	50 to 200	1	1
Methane (CH_4)[c]	12 (±3)	21	25
Nitrous Oxide (N_2O)	120	310	298
Hydrofluorocarbons:			
HFC-23	264	11,700	14,800
HFC-32	5.6	650	675
HFC-125	32.6	2,800	3,500
HFC-134a	14.6	1,300	1,430
HFC-143a	48.3	3,800	4,470
HFC-152a	1.5	140	124
HFC-227ea	36.5	2,900	3,220
HFC-236fa	209	6,300	9,810
HFC-4310mee	17.1	1,300	1,030
Perfluoromethane: CF_4	50,000	6,500	7,390
Perfluoroethane: C_2F_6	10,000	9,200	12,200
Perfluorobutane: C_4F_{10}	2,600	7,000	8,860
Perfluoro-2-methylpentane: C_6F_{14}	3,200	7,400	9,300
Sulfur Hexafluoride (SF_6)	3,200	23,900	22,800

Notes: The IPCC has published updated global warming potential (GWP) values in its Fifth Assessment Report (2013) that reflect new information on atmospheric lifetimes of GHGs and an improved calculation of the radiative forcing of CO_2 (radiative forcing is the difference of energy from sunlight received by the earth and radiated back into space). However, GWP values identified in the Second Assessment Report are still used by BAAQMD to maintain consistency in GHG emissions modeling. In addition, the 2008 Scoping Plan was based on the GWP values in the Second Assessment Report.
a. Based on 100-Year Time Horizon of the GWP of the air pollutant relative to CO_2. Intergovernmental Panel on Climate Change. 2001. Third Assessment Report: Climate Change 2001. New York: Cambridge University Press.
a. Based on 100-Year Time Horizon of the GWP of the air pollutant relative to CO_2. Intergovernmental Panel on Climate Change. 2007. Fourth Assessment Report: Climate Change 2001. New York: Cambridge University Press.
c. The methane GWP includes direct effects and indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.
Sources: Intergovernmental Panel on Climate Change, 2001, Third Assessment Report: Climate Change 2001, New York: Cambridge University Press; and Intergovernmental Panel on Climate Change, 2007, Fourth Assessment Report: Climate Change 2001, New York: Cambridge University Press.

In 2013, the statewide GHG emissions inventory was updated for 2000 to 2012 emissions using the GWPs in IPCC's Fourth Assessment Report. Based on these GWPs, California produced 459 $MMTCO_2e$ GHG emissions in 2012. California's transportation sector remains the single largest generator of GHG emissions, producing 36.5 percent of the State's total emissions. Electricity consumption made up 20.7 percent, and industrial activities

produced 19.4 percent. Other major sectors of GHG emissions include commercial and residential, recycling and waste, high global warming potential GHGs, agriculture, and forestry.[15]

Human Influence on Climate Change

For approximately 1,000 years before the Industrial Revolution, the amount of GHGs in the atmosphere remained relatively constant. During the 20th century, however, scientists observed a rapid change in the climate and climate change pollutants that is attributable to human activities. The amount of CO_2 has increased by more than 35 percent since preindustrial times and has increased at an average rate of 1.4 parts per million (ppm) per year since 1960, mainly due to combustion of fossil fuels and deforestation.[16] These recent changes in climate change pollutants far exceed the extremes of the ice ages, and the global mean temperature is rising at a rate that cannot be explained by natural causes alone.[17] Human activities are directly altering the chemical composition of the atmosphere through the buildup of climate change pollutants.[18]

Projections of climate change depend heavily on future human activity. Therefore, climate models are based on different emission scenarios that account for historical trends in emissions as well as observations on the climate record that assess the human influence of the trend and projections for extreme weather events. Climate-change scenarios are affected by varying degrees of uncertainty, including uncertainty regarding the magnitude of the direction of the trends for:

- warmer and fewer cold days and nights over most land areas;
- warmer and more frequent hot days and nights over most land areas;
- an increase in frequency of warm spells/heat waves over most land areas;
- an increase in frequency of heavy precipitation events (or proportion of total rainfall from heavy falls) over most areas; areas affected by drought increases;
- an increase in intense tropical cyclone activity; and
- increased incidence of extreme high sea level (excludes tsunamis).

IPCC's 2007 IPCC Fourth Assessment Report projects that the global mean temperature increase from 1990 to 2100 under different climate-change scenarios will range from 1.4 to 5.8 degrees Celsius (°C; 2.5 to 10.4 degrees Fahrenheit [°F]). In the past, gradual changes in the Earth's temperature changed the distribution of species, availability of water, etc. However, human activities are accelerating this process so that environmental impacts associated with climate change no longer occur in a geologic time frame, but within a human lifetime.[19]

[15] California Air Resources Board, California Greenhouse Gas Inventory for 2000–2009: By Category as Defined by the Scoping Plan, March 24, 2014.
[16] Intergovernmental Panel on Climate Change, Fourth Assessment Report: Climate Change 2007, New York: Cambridge University Press.
[17] At the end of the last ice age, the concentration of CO_2 increased by around 100 ppm (parts per million) over about 8,000 years, or approximately 1.25 ppm per century. Since the start of the industrial revolution, the rate of increase has accelerated markedly. The rate of CO_2 accumulation currently stands at around 150 ppm/century—more than 200 times faster than the background rate for the past 15,000 years.
[18] California Climate Action Team, 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature, March.
[19] Intergovernmental Panel on Climate Change, Fourth Assessment Report: Climate Change 2007, New York: Cambridge University Press.

Potential Climate Change Impacts for California

Like the variability in the projections of the expected increase in global surface temperatures, the environmental consequences of gradual changes in the Earth's temperature are hard to predict. In California and western North America, observations of the climate have shown: (1) a trend toward warmer winter and spring temperatures, (2) a smaller fraction of precipitation falling as snow, (3) a decrease in the amount of spring snow accumulation in the lower and middle elevation mountain zones, (4) a shift in the timing of snowmelt of 5 to 30 days earlier in the spring, and (5) a similar shift (5 to 30 days earlier) in the timing of spring flower blooms.[20] According to the California Climate Action Team—a committee of State agency secretaries and the heads of agency, boards, and departments, led by the Secretary of the California Environmental Protection Agency—even if actions could be taken to immediately curtail climate change emissions, the potency of emissions that have already built up, their long atmospheric lifetimes (see Table 4.6-1), and the inertia of the Earth's climate system could produce as much as 0.6◦C (1◦F) of additional warming. Consequently, some impacts from climate change are now considered unavoidable. Global climate change risks to California are shown in Table 4.6-2 and include public health impacts, water resources impacts, agricultural impacts, coastal sea level impacts, forest and biological resource impacts, and energy impacts. Specific climate change impacts that could affect the city include health impacts from deterioration of air quality, water resources impacts from a reduction in water supply, and increased energy demand, and sea level rise (see also Chapter 4.8, Hydrology and Water Quality, of this Draft EIR, for flood impacts).

4.6.1.1 REGULATORY FRAMEWORK

This section describes the federal, State, and local regulations applicable to GHG emissions.

Federal Regulations

The United States Environmental Protection Agency (US EPA) announced on December 7, 2009 that GHG emissions threaten the public health and welfare of the American people and GHG emissions from on-road vehicles contribute to that threat. The EPA's final findings respond to the 2007 US Supreme Court decision that GHG emissions fit within the Clean Air Act definition of air pollutants. The findings did not in and of themselves impose any emission reduction requirements, but allowed the US EPA to finalize the GHG standards proposed in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation.[21]

[20] California Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature, March 2006.
[21] United States Environmental Protection Agency (EPA), Greenhouse Gases Threaten Public Health and the Environment: Science overwhelmingly shows GHG concentrations at unprecedented levels due to human activity, December 2009, http://yosemite.epa.gov/opa/admpress.nsf/0/08D11A451131BCA585257685005BF252, accessed on September 24, 2014.

TABLE 4.6-2 SUMMARY OF CLIMATE CHANGE RISKS TO CALIFORNIA

Impact Category	Potential Risk
Public Health Impacts	Poor air quality made worse More severe heat
Water Resources Impacts	Decreasing Sierra Nevada snow pack Challenges in securing adequate water supply Potential reduction in hydropower Loss of winter recreation
Agricultural Impacts	Increasing temperature Increasing threats from pests and pathogens Expanded ranges of agricultural weeds Declining productivity Irregular blooms and harvests
Coastal Sea Level Impacts	Accelerated sea level rise Increasing coastal floods Worsened impacts on infrastructure
Forest and Biological Resource Impacts	Increased risk and severity of wildfires Lengthening of the wildfire season Movement of forest areas Conversion of forest to grassland Declining forest productivity Increasing threats from pest and pathogens Shifting vegetation and species distribution Altered timing of migration and mating habits Loss of sensitive or slow-moving species
Energy Demand Impacts	Potential reduction in hydropower Increased energy demand

Sources: California Energy Commission, Our Changing Climate: Assessing the Risks to California, 2006 Biennial Report, California Climate Change Center, CEC-500-2006-077, 2006; California Energy Commission, The Future Is Now: An Update on Climate Change Science, Impacts, and Response Options for California, CEC-500-2008-0077, 2008.

The US EPA's endangerment finding covers emissions of six key GHGs—CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and SF_6—that have been the subject of scrutiny and intense analysis for decades by scientists in the United States and around the world. The first three are applicable to the proposed Project because they constitute the majority of GHG emissions from the onsite land uses, and per BAAQMD guidance are the GHG emissions that should be evaluated as part of a GHG emissions inventory.

United States Mandatory Report Rule for GHGs (2009)

In response to the endangerment finding, the US EPA issued the Mandatory Reporting of GHG Rule that requires substantial emitters of GHG emissions (e.g. large stationary sources) to report GHG emissions data. Facilities that emit 25,000 $MTCO_2e$ per year are required to submit an annual report.

Update to Corporate Average Fuel Economy Standards (2010/2012)

The current Corporate Average Fuel Economy (CAFE) standards (for model years 2011 to 2016) incorporate stricter fuel economy requirements promulgated by the federal government and California into one uniform standard. Additionally, automakers are required to cut GHG emissions in new vehicles by roughly 25 percent by 2016 (resulting in a fleet average of 35.5 miles per gallon [mpg] by 2016). Rulemaking to adopt these new standards was completed in 2010. California agreed to allow automakers who show compliance with the national program to also be considered to be in compliance with State requirements. The federal government issued new standards in 2012 for model years 2017-2025, which will require a fleet average of 54.5 mpg in 2025.

US EPA Regulation of Stationary Sources Under the Clean Air Act (Ongoing)

Pursuant to its authority under the Clean Air Act (CAA), the US EPA has been developing regulations for new stationary sources such as power plants, refineries, and other large sources of emissions. Pursuant to the President's 2013 Climate Action Plan, the US EPA will be directed to also develop regulations for existing stationary sources.

State Regulations

Current State guidance and goals for reducing GHG emissions are generally embodied in Executive Order S-03-05, Assembly Bill 32 (AB 32), and Senate Bill 375 (SB 375).

Executive Order S-03-05

Executive Order S-3-05, signed June 1, 2005, set the following GHG reduction targets for the State:

- Reduce statewide GHG emissions to 2000 levels by 2010.
- Reduce statewide GHG emissions to 1990 levels by 2020.
- Reduce statewide GHG emissions to 80 percent below 1990 levels by 2050.

Assembly Bill 32, the Global Warming Solutions Act (2006)

Current State of California guidance and goals for reductions in GHG emissions are generally embodied in AB 32, the Global Warming Solutions Act. AB 32 was passed by the California State legislature on August 31, 2006, to place the State on a course toward reducing its contribution of GHG emissions. AB 32 follows the 2020 tier of emissions reduction targets established in Executive Order S-3-05.

CARB 2008 Scoping Plan

The final Scoping Plan was adopted by CARB on December 11, 2008. AB 32 directed CARB to adopt discrete early action measures to reduce GHG emissions and outline additional reduction measures to meet the 2020 target. In order to effectively implement the emissions cap, AB 32 directed CARB to establish a mandatory reporting system to track and monitor GHG emissions levels for large stationary sources that generate more than 25,000 $MTCO_2e$ per year, prepare a plan demonstrating how the 2020 deadline can be met, and develop appropriate regulations and programs to implement the plan by 2012.

The 2008 Scoping Plan estimated that GHG emissions in California are anticipated to be approximately 596 $MMTCO_2e$ in 2020 if no steps are taken to reduce GHG emissions (i.e. the business as usual [BAU] scenario). In December 2007, CARB approved a 2020 emissions limit of 427 $MMTCO_2e$ (471 million tons) for the State. The 2020 target requires a total emissions reduction of 169 $MMTCO_2e$, or 28.5 percent for the year 2020 (i.e. 28.5 percent of 596 $MMTCO_2e$).[22, 23]

Since release of the 2008 Scoping Plan, CARB has updated the Statewide GHG emissions inventory to reflect GHG emissions in light of the economic downturn and of measures not previously considered in the 2008 Scoping Plan baseline inventory. The updated forecast predicts BAU emissions to be 545 $MMTCO_2e$ by 2020. The revised BAU 2020 forecast shows that the State would have to reduce GHG emissions by 21.7 percent from BAU in order to achieve 1990 levels, compared to the 28.5 percent reduction that was estimated in the 2008 Scoping Plan. The new inventory also identifies that if the updated 2020 forecast includes the reductions assumed from implementation of the Pavley standards (26 $MMTCO_2e$ of reductions) and the 33 percent renewable portfolio standard (RPS) (12 $MMTCO_2e$ of reductions), the forecast would be 507 $MMTCO_2e$ in 2020, in which case an estimated 80 $MMTCO_2e$ of additional reductions would be necessary to achieve the statewide GHG emissions reduction target of AB 32, or a 15.7 percent reduction compared to adjusted BAU forecast (i.e. 15.7 percent of 507 $MMTCO_2e$).[24]

Key elements of CARB's GHG reduction plan that may be applicable to the proposed Project include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards (adopted and cycle updates in progress).
- Achieving a mix of the State's energy generation in which 33 percent is from renewable sources (anticipated by 2020).
- A California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system for large stationary sources (adopted 2011).
- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets (several Sustainable Communities Strategies have been adopted).
- Adopting and implementing measures pursuant to State laws and policies, including California's clean car standards (amendments to the Pavley Standards adopted 2009; Advanced Clean Car standard adopted 2012), goods movement measures, and the Low Carbon Fuel Standard (LCFS) (adopted 2009).
- Creating target fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation (in progress).

Table 4.6-3 shows the anticipated reductions from regulations and programs outlined in the 2008 Scoping Plan. Although local government operations were not accounted for in achieving the 2020 emissions reduction, CARB estimates that land use changes implemented by local governments that integrate jobs, housing, and services result

[22] California Air Resources Board, Climate Change Scoping Plan: A Framework for Change, 2008.
[23] CARB defines BAU in its Scoping Plan as emissions levels that would occur if California continued to grow and add new GHG emissions but did not adopt any measures to reduce emissions. Projections for each emission-generating sector were compiled and used to estimate emissions for 2020 based on 2002-2004 emissions intensities. Under CARB's definition of BAU, new growth is assumed to have the same carbon intensities as was typical from 2002 through 2004.
[24] California Air Resources Board, Status of Scoping Plan Recommended Measures, 2012, http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf, accessed on September 24, 2014.

in a reduction of 5 $MMTCO_2e$, which is approximately 3 percent of the 2020 GHG emissions reduction goal. In recognition of the critical role local governments play in the successful implementation of AB 32, the 2008 Scoping Plan cited a GHG reduction goal for local governments that is 15 percent of current levels (2005-2008) by 2020 to ensure that municipal and community-wide emissions match the State's reduction target.[25] Measures that local governments take to support shifts in land use patterns are anticipated to emphasize compact, low-impact growth over development in greenfields, resulting in fewer VMT.[26]

TABLE 4.6-3 SCOPING PLAN GHG REDUCTION MEASURES AND REDUCTIONS TOWARD 2020 TARGET

Recommended Reduction Measures	Reductions Counted toward 2020 Target of 169 MMT CO_2e	Percentage of Statewide 2020 Target
Cap and Trade Program and Associated Measures		
California Light-Duty Vehicle GHG Standards	31.7	19%
Energy Efficiency	26.3	16%
Renewable Portfolio Standard (33 percent by 2020)	21.3	13%
Low Carbon Fuel Standard	15	9%
Regional Transportation-Related GHG Targets[a]	5	3%
Vehicle Efficiency Measures	4.5	3%
Goods Movement	3.7	2%
Million Solar Roofs	2.1	1%
Medium/Heavy Duty Vehicles	1.4	1%
High Speed Rail	1.0	1%
Industrial Measures	0.3	0%
Additional Reduction Necessary to Achieve Cap	34.4	20%
Total Cap and Trade Program Reductions	*146.7*	*87%*
Uncapped Sources/Sectors Measures		
High Global Warming Potential Gas Measures	20.2	12%
Sustainable Forests	5	3%
Industrial Measures (for sources not covered under cap and trade program)	1.1	1%
Recycling and Waste (landfill methane capture)	1	1%

[25] The Scoping Plan references a goal for local governments to reduce community GHG emissions by 15 percent from current (interpreted as 2008) levels by 2020, but it does not rely on local GHG reduction targets established by local governments to meet the State's GHG reduction target of AB 32.
[26] California Air Resources Board, Climate Change Scoping Plan: a Framework for Change, 2008.

TABLE 4.6-3 SCOPING PLAN GHG REDUCTION MEASURES AND REDUCTIONS TOWARD 2020 TARGET

Recommended Reduction Measures	Reductions Counted toward 2020 Target of 169 MMT CO_2e	Percentage of Statewide 2020 Target
Total Uncapped Sources/Sectors Reductions	*27.3*	*16%*
Total Reductions Counted toward 2020 Target	*174*	*100%*
Other Recommended Measures – Not Counted toward 2020 Target		
State Government Operations	1.0 to 2.0	1%
Local Government Operations[b]	To Be Determined	NA
Green Buildings	26	15%
Recycling and Waste	9	5%
Water Sector Measures	4.8	3%
Methane Capture at Large Dairies	1	1%
Total Other Recommended Measures – Not Counted toward 2020 Target	*42.8*	*NA*

Notes: The percentages in the right-hand column add up to more than 100 percent because the emissions reduction goal is 169 MMTCO2e and the Scoping Plan identifies 174 $MTCO_2e$ of emissions reductions strategies.
MMTCO2e: million metric tons of CO_2e
a Reductions represent an estimate of what may be achieved from local land use changes. It is not the SB 375 regional target.
b According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 million metric tons of CO_2e (or approximately 1.2 percent of the GHG reduction target). However, these reductions were not included in the Scoping Plan reductions to achieve the 2020 target.
Source: California Air Resources Board, 2008, Climate Change Scoping Plan: A Framework for Change.

2014 Update to the Scoping Plan

CARB recently completed a five-year update to the 2008 Scoping Plan, as required by AB 32. The final Update to the Scoping Plan was released in May, and CARB adopted it at the May 22, 2014, board hearing. The Update to the Scoping Plan defines CARB's climate change priorities for the next five years and lays the groundwork to reach post-2020 goals in Executive Orders S-3-05 and B-16-2012. The update includes the latest scientific findings related to climate change and its impacts, including short-lived climate pollutants.

The GHG target identified in the 2008 Scoping Plan is based on IPCC's GWPs identified in the Second and Third Assessment Reports (see Table 4.6-1). IPCC's Fourth and Fifth Assessment Reports identified more recent GWP values based on the latest available science. CARB recalculated the 1990 GHG emission levels with the updated GWPs in the Fourth Assessment Report, and the 427 $MMTCO_2e$ 1990 emissions level and 2020 GHG emissions limit, established in response to AB 32, is slightly higher, at 431 $MMTCO_2e$.[27]

[27] California Air Resources Board (CARB), Proposed First Update to the Climate Change Scoping Plan: Building on the Framework, 2014, http://www.arb.ca.gov/cc/scopingplan/2013_update/draft_proposed_first_update.pdf, accessed on May 15, 2014.

The update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the original 2008 Scoping Plan. As identified in the Update to the Scoping Plan, California is on track to meeting the goals of AB 32. However, the Update to the Scoping Plan also addresses the State's longer-term GHG goals within a post-2020 element. The post-2020 element provides a high level view of a long-term strategy for meeting the 2050 GHG goals, including a recommendation for the State to adopt a mid-term target. According to the Update to the Scoping Plan, local government reduction targets should chart a reduction trajectory that is consistent with, or exceeds, the trajectory created by Statewide goals.[28]

According to the Update to the Scoping Plan, reducing emissions to 80 percent below 1990 levels will require a fundamental shift to efficient, clean energy in every sector of the economy. Progressing toward California's 2050 climate targets will require significant acceleration of GHG reduction rates. Emissions from 2020 to 2050 will have to decline several times faster than the rate needed to reach the 2020 emissions limit. [29]

Senate Bill 375, the Sustainable Communities and Climate Protection Act (2008)

In 2008, SB 375, the Sustainable Communities and Climate Protection Act, was adopted to connect the GHG emissions reduction targets established in the 2008 Scoping Plan for the transportation sector to local land use decisions that affect travel behavior. Its intent is to reduce GHG emissions from light-duty trucks and automobiles (it excludes emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations with local land use planning to reduce VMT and vehicle trips. Specifically, SB 375 required CARB to establish GHG emissions reduction targets for each of the 18 metropolitan planning organizations (MPOs). The Metropolitan Transportation Commission (MTC) is the MPO for the nine-county San Francisco Bay Area region. MTC's targets are a 7 percent per capita reduction in GHG emissions from light-duty trucks and passenger vehicles from 2005 by 2020, and 15 percent per capita reduction from 2005 levels by 2035.[30]

The 2020 targets are smaller than the 2035 targets because a significant portion of the built environment in 2020 has been defined by decisions that have already been made. In general, the 2020 scenarios reflect that more time is needed for large land use and transportation infrastructure changes. Most of the reductions in the interim are anticipated to come from improving the efficiency of the region's existing transportation network. Adherence to the targets would result in 3 $MMTCO_2e$ reductions by 2020 and 15 $MMTCO_2e$ reductions by 2035. Based on these reductions, the passenger vehicle target in CARB's Scoping Plan (for AB 32) would be met.[31]

CARB is currently in the process of updating the next round of targets and methodology. Considerations for the next round of targets include whether to change the nature or magnitude of the emissions reduction targets for each of the MPOs. The current metric used is the GHG per capita efficiency metric. A metric that may be considered in moving forward include a VMT per capita metric. Additionally, other considerations include

[28] California Air Resources Board (CARB), Proposed First Update to the Climate Change Scoping Plan: Building on the Framework, 2014, http://www.arb.ca.gov/cc/scopingplan/2013_update/draft_proposed_first_update.pdf, accessed on May 15, 2014.
[29] California Air Resources Board (CARB), Proposed First Update to the Climate Change Scoping Plan: Building on the Framework, 2014, http://www.arb.ca.gov/cc/scopingplan/2013_update/draft_proposed_first_update.pdf, accessed on May 15, 2014.
[30] California Air Resources Board, Staff Report, Proposed Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375, August 2010.
[31] California Air Resources Board, Staff Report, Proposed Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375, August 2010.

establishing a single uniform target to supersede the multiple targets specific to each of the MPOs. Furthermore, CARB is also considering whether the target setting methodology should account for reductions associated with policies that support advances in technology that reduces emissions.[32]

Plan Bay Area: Strategy for a Sustainable Region

Plan Bay Area is the Bay Area's Regional Transportation Plan (RTP)/Sustainable Community Strategy (SCS). The *Plan Bay Area* was adopted jointly by ABAG and MTC July 18, 2013.[33] The SCS lays out a development scenario for the region, which when integrated with the transportation network and other transportation measures and policies, would reduce GHG emissions from transportation (excluding goods movement) beyond the per capita reduction targets identified by CARB. The *Plan Bay Area* meets a 16 percent per capita reduction of GHG emissions by 2035 and a 10 percent per capita reduction by 2020 from 2005 conditions.

As part of the implementing framework for *Plan Bay Area*, local governments have identified Priority Development Areas (PDAs) to focus growth. PDAs are transit-oriented, infill development opportunity areas within existing communities. Overall, well over two-thirds of all regional growth in the Bay Area by 2040 is allocated within PDAs. PDAs are expected to accommodate 80 percent (or over 525,570 units) of new housing and 66 percent (or 744,230) of new jobs in the region.[34] The Specific Plan Area encompasses the Millbrae Transit Station Area PDA.[35] The Specific Plan Update calls for expanding the pedestrian-friendly nature of the city's downtown and integrating the diverse uses of the surrounding communities. The envisioned land use pattern for this area includes a mix of office and retail uses between the transit station and US Highway 101 with hotels, theaters, and mixed-use residential along El Camino Real and close to downtown.[36]

Assembly Bill 1493

California vehicle GHG emission standards were enacted under AB 1493 (Pavley I). Pavley I is a clean-car standard that reduces GHG emissions from new passenger vehicles (light-duty auto to medium-duty vehicles) from 2009 through 2016 and is anticipated to reduce GHG emissions from new passenger vehicles by 30 percent during the same time. California implements the Pavley I standards through a waiver granted to California by the EPA. In 2012, the EPA issued a Final Rulemaking that sets even more stringent fuel economy and GHG emissions standards for model year 2017 through 2025 light-duty vehicles (see also the discussion on the update to the CAFE standards under Federal Laws, above). In January 2012, CARB approved the Advanced Clean Cars program (formerly known as Pavley II) for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single

[32] California Air Resources Board, Preliminary Draft Staff Report, SB 375 Greenhouse Gas Emissions Reduction Target Update Process, August 2014, http://www.arb.ca.gov/cc/sb375/pre_draft_target_update_sr.pdf, accessed on September 24, 2014.
[33] It should be noted that the Bay Area Citizens filed a lawsuit on MTC's and ABAG's adoption of Plan Bay Area.
[34] Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), Plan Bay Area: Strategy for a Sustainable Region, July 18, 2013.
[35] Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), Plan Bay Area: Strategy for a Sustainable Region, July 18, 2013, http://geocommons.com/maps/141979, accessed on February 16, 2015.
[36] Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), 2012. *Visions for Priority Development Areas Jobs-Housing Connection Strategy,* May. http://onebayarea.org/file10010.html.

package of standards. Under California's Advanced Clean Car program, by 2025, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.[37]

Executive Order S-01-07

On January 18, 2007, the State set a new low carbon fuel standard (LCFS) for transportation fuels sold within the State. Executive Order S-1-07 sets a declining standard for GHG emissions measured in carbon dioxide equivalent gram per unit of fuel energy sold in California. The LCFS requires a reduction of 2.5 percent in the carbon intensity of California's transportation fuels by 2015 and a reduction of at least 10 percent by 2020. The standard applies to refiners, blenders, producers, and importers of transportation fuels, and would use market-based mechanisms to allow these providers to choose how they reduce emissions during the "fuel cycle" using the most economically feasible methods.

Executive Order B-16-2012

On March 23, 2012, the State directed CARB, the California Energy Commission (CEC), the Public Utilities Commission, and other relevant agencies to work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to accommodate zero-emissions vehicles in major metropolitan areas, including infrastructure to support them (e.g. electric vehicle charging stations). The executive order also directs the number of zero-emission vehicles in California's State vehicle fleet to increase through the normal course of fleet replacement so that at least 10 percent of fleet purchases of light-duty vehicles are zero-emission by 2015 and at least 25 percent by 2020. The executive order also establishes a target for the transportation sector of reducing GHG emissions to 80 percent below 1990 levels by 2050.

Senate Bills 1078 and 107, and Executive Order S-14-08

A major component of California's Renewable Energy Program is the renewable portfolio standard (RPS) established under Senate Bills 1078 (Sher)[38] and 107 (Simitian)[39]. Under the RPS, certain retail sellers of electricity were required to increase the amount of renewable energy each year by at least 1 percent in order to reach at least 20 percent by December 30, 2010. CARB has now approved an even higher goal of 33 percent by 2020. In 2011, the State legislature adopted this higher standard in SBX1-2. Executive Order S-14-08 was signed in November 2008, and expands the State's Renewable Energy Standard to 33 percent renewable power by 2020. Renewable sources of electricity include wind, small hydropower, solar, geothermal, biomass, and biogas. The increase in renewable sources for electricity production will decrease indirect GHG emissions from development projects because electricity production from renewable sources is generally considered carbon neutral.

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[37] See also the discussion on the update to the CAFE standards under Federal Laws, above. In January 2012, CARB approved the Advanced Clean Cars program (formerly known as Pavley II) for model years 2017 through 2025. The program combines the control of smog, soot and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards. Under California's Advanced Clean Car program, by 2025, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

[38] Official California Legislative Information, http://www.leginfo.ca.gov/pub/01-02/bill/sen/sb_1051-1100/sb_1078_bill_20020912_chaptered.html, accessed on September 24, 2014.

[39] Official California Legislative Information , http://www.leginfo.ca.gov/pub/05-06/bill/sen/sb_0101-0150/sb_107_bill_20060926_chaptered.html, accessed on September 24, 2014.

California Building Code

Energy conservation standards for new residential and non-residential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the CEC) in June 1977 and most recently revised in 2013 (Title 24, Part 6, of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. On May 31, 2012, the CEC adopted the 2013 Building and Energy Efficiency Standards, which went into effect on July 1, 2014. Buildings that are constructed in accordance with the 2013 Building and Energy Efficiency Standards are 25 percent (residential) to 30 percent (non-residential) more energy efficient than those constructed under the prior 2008 standards as a result of better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses.

CALGreen Building Code

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11, Title 24, known as "CALGreen") was adopted as part of the California Building Standards Code (Title 24, CCR). CALGreen established planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and indoor air contaminants.[40] The mandatory provisions of CALGreen became effective January 1, 2011 and were updated most recently in 2013. The building efficiency standards are enforced through the local building permit process.

2006 Appliance Efficiency Regulations

The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608) were adopted by the CEC on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances. Though these regulations are now often viewed as "business as usual," they exceed the standards imposed by all other states, and they reduce GHG emissions by reducing energy demand.

Local Regulations

Millbrae 1998-2015 General Plan

The City of Millbrae General Plan, adopted in 1998, includes goals, policies and implementing programs that relate to reducing GHG emissions. Specifically, the Land Use, Circulation, and Housing Elements include policies aimed at reducing GHG emissions. These policies are listed in Table 4.6-4.

[40] The green building standards became mandatory in the 2010 edition of the code.

TABLE 4.6-4 GENERAL PLAN POLICIES RELEVANT TO GHG EMISSIONS

Number	Policy
Land Use (LU) Element	
LU4.5	Sustainable Millbrae. In order to assure the long-term quality of life in Millbrae, consider the integration of the health of the local economy along with environmental integrity and human well-being when considering future projects.
LU5.6	Recycled Water. Consider the use of high quality recycled water for parks and private landscaping uses.
LU5.7	Water Conservation Techniques. Promote the use of low-water-use and fire suppression landscaping and other water conservation measures.
Circulation (C) Element	
C1.5	Transportation and Transit Funding. Encourage regional agencies to provide adequate regional and local funding of roadway and transit improvements through sales tax initiatives, traffic impact fees and other measures when necessary. Ensure that the City remains eligible for and aggressively pursues all available roadway and transit improvements funds.
C1.8	Bikeway and Pedestrian Improvements. Provide appropriate bikeway and pedestrian improvements to promote alternative transportation uses.
C2.5	Coordinate with Major Transportation Agencies. Ensure that continuous coordination is carried out with San Francisco International Airport, BART, Caltrain, SamTrans, Metropolitan Transportation Commission (MTC) and Caltrans to provide funding for appropriate improvements and to mitigate impacts.
C4.1	Transit Access. Encourage the increased regional use of transit to relieve commuter congestion along the US 101, Interstate 280 and SR 82 corridor and to serve the transportation needs of San Mateo County. In coordination with the CMP and transit service providers, attain a coordinated system that is safe, efficient and reliable to provide a convenient alternative to driving. Considerations include: a. Children, commuters and senior citizens should be housed within walking distance (1/4 mile) of bus stops. b. Commuters should be able to easily connect among different modes of transit, whose operating hours should correspond to need. c. Coordination of Sam Trans, BART and Cal Train services. Provision for mobility-impaired individuals.
C4.2	Millbrae BART/Caltrain Station Area. Support development of the Millbrae BART /Caltrain Station area as part of the BART and Caltrain system and provide area specific land use planning and coordination with related agencies to ensure minimal impacts on the City of Millbrae.
C4.6	Reduced Work Trips. Adopt land use, housing and circulation policies supporting the jobs/ housing balance, including local job creation, TSM, provision of housing for all income levels, satellite office sites, and telecommunications improvements to reduce or shorten home to work trips along the travel corridor.
C4.7	Transportation Systems and Transportation Demand Management. Implement and enforce local and regional TSM and TDM programs.
C4.8	Bikeways Standards. Pursue the following bikeways standards : a. Class I Bikeways: Improved surface of varying width, physically separated from motorized traffic. Can be combined with pedestrian paths and trails~ if properly designed. b. Examples of improved bikeway surfaces include decomposed granite and asphalt concrete. c. Class II Bikeways: Paved right-of-way adjacent to vehicular traffic designed for the exclusive use of bicyclists. Class III Bikeways: Paved right-of-way shared with motorized vehicles and designated as a bike route.

TABLE 4.6-4 GENERAL PLAN POLICIES RELEVANT TO GHG EMISSIONS

Number	Policy
C4.9	Bikeways System. Develop and maintain a safe and logical bikeways system which is coordinated with the countywide system, and will include separate bicycle lanes where possible and posted bicycle routes. This system is intended as a viable alternative mode of travel throughout the City.
C4.10	Bike Parking Facilities. Require adequate bike parking facilities at transportation centers, public parks and buildings, recreational facilities, commercial centers and large multi-family residential projects.
C4.15	Pedestrian System. Develop a safe, pleasant pedestrian system that provides direct and convenient pedestrian access, designed to serve all segments of the public including the young, the aged, and the disabled. Pedestrian safety shall be duly considered in the design of intersection and other roadway improvements. The pedestrian circulation system is intended as a viable alternative mode of travel throughout the City by providing pedestrian facilities, including trails, paths, and sidewalks that are safe, direct and convenient.
CIP-15	TSM and TDM Requirements. Continue to implement TSM and TDM requirements through MTSMA and provide incentives to employers to hire locally.
Housing (H) Element	
H2.4	Energy Conservation in New Housing. Promote the use of energy conservation in residential construction by incorporating energy conservation in all new residential development. New homes shall meet State standards for energy conservation.

Source: City of Millbrae General Plan 1998-2015, adopted 1998. 2015-2022 Housing Element Public Hearing Draft April 2015.

Millbrae Municipal Code

The City of Millbrae Municipal Code contains all ordinances for the city. The Municipal Code is organized by Title, Chapter, and Section. The current Municipal Code is up to date through Ordinance 747, passed May 27, 2014. The following provisions of Title 9, Building Regulations, of the Municipal Code help minimize GHG emissions associated with new development projects in Millbrae:

- **Chapter 9.35, California Green Building Code.** The purpose of this chapter is to adopt the California Green Building Code, which establishes the minimum requirements for the effective use of green building in the design of new residential, commercial and industrial buildings and structures and also includes additions and alterations to all existing buildings and structures.
- **Chapter 9.50, Energy Code.** The purpose of this chapter is to adopt the code of rules and regulations known and designated as the California Energy Code, 2013 Edition, with the California State Amendments, hereinafter called the energy code, which establishes the minimum requirements for effective use of energy in the design of new buildings and structures, and additions to existing buildings.
- **Chapter 9.60, Indoor Water Use Efficiency Regulations.** The purpose of these regulations is to encourage the conservation of natural resources; increase water efficiency and lower water costs; reduce the operating and maintenance costs for buildings; promote a healthier indoor environment; and give guidance to ensure compliance with state and federal law.

4.6.1.2 EXISTING CONDITIONS

Specific Plan Greenhouse Gas Emissions Inventory

Existing land uses in the Specific Plan Area generally consist of commercial, light industrial, and multi-family residential in addition to the Millbrae BART/Caltrain Station (Millbrae Station). Commercial uses include banks, retail, a motel and service-oriented businesses such as restaurants, gas station, and car wash. The central portion of the area consists of surface parking lots in addition pockets of vacant undeveloped properties. GHG emissions generated by existing land uses in the Specific Plan Area were modeled with CalEEMod 2013.2.2 based on trip generation and VMT data provided by Fehr & Peers, and are shown in Table 4.6-5.

TABLE 4.6-5 GHG EMISSIONS GENERATED BY EXISTING LAND USES WITHIN THE SPECIFIC PLAN AREA

	Existing GHG Emissions	
Category	$MTCO_2e$/Year	Percent of Total
Operational Emissions[c]		
Area	17	<1%
Energy	3,273	23%
On-Road Mobile Sources	9,470	65%
Waste	1,617	11%
Water/Wastewater	99	1%
Total with Waste	14,470	100%
Total Without Waste[a]	12,859	—
Service Population (SP)[b]	1,896	—
$MTCO_2e$/SP	6.78	—

Note: Emissions may not total to 100 percent due to rounding. Existing buildings are assumed to achieve the 2005 Building Energy Efficiency Standards.
a. BAAQMD did not include solid waste emissions when developing the per capita significance thresholds. Therefore, total GHG emissions with and without the Waste Generation sector are included. If these emissions are included in the analysis for the existing conditions, the existing land uses per capita emissions would be 7.63 $MTCO_2e$/SP/yr.
b. Service population based on a projected 1,002 employees, 816 permanent residents, and 78 hotel patrons, which are included as they are a projected known quantity and would contribute to the overall emissions generated.
c. Source: CalEEMod 2013.2.2 Based on 2014 emission rates for existing uses and trip generation and VMT data provided by Fehr & Peers.

4.6.2 STANDARDS OF SIGNIFICANCE

4.6.2.1 CEQA THRESHOLDS

According to Appendix G, Environmental Checklist, of the CEQA Guidelines, the proposed Project would be considered significant if the Project would:

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

4.6.2.2 BAAQMD PLAN-LEVEL SIGNIFICANCE CRITERIA

BAAQMD CEQA Guidelines

The BAAQMD CEQA Air Quality Guidelines were prepared to assist in the evaluation of air quality impacts of projects and plans proposed within the Bay Area. The guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process, consistent with CEQA requirements, and include recommended thresholds of significance, mitigation measures, and background air quality information. They also include recommended assessment methodologies for air toxics, odors, and GHG emissions. In June 2010, the BAAQMD's Board of Directors adopted CEQA thresholds of significance and an update of the CEQA Guidelines. In May 2011, the updated BAAQMD CEQA Air Quality Guidelines were amended to include a risk and hazards threshold for new receptors and modified procedures for assessing impacts related to risk and hazard impacts.

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the BAAQMD CEQA Air Quality Guidelines. The court did not determine whether the thresholds of significance were valid on their merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD complied with CEQA.

Following the court's order, the BAAQMD released revised CEQA Air Quality Guidelines in May of 2012 that include guidance on calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures, and which set aside the significance thresholds. The BAAQMD recognizes that lead agencies may rely on the previously recommended Thresholds of Significance contained in its CEQA Guidelines adopted in 1999. The Alameda County Superior Court, in ordering BAAQMD to set aside the thresholds, did not address the merits of the science or evidence supporting the thresholds. The City finds, therefore, that despite the Superior Court's ruling, and in light of the subsequent case history discussed below, the science and reasoning contained in the BAAQMD 2011 CEQA Air Quality Guidelines provide the

latest state-of-the-art guidance available. For that reason, substantial evidence supports continued use of the BAAQMD 2011 CEQA Air Quality Guidelines.

On August 13, 2013, the First District Court of Appeal ordered the trial court to reverse the judgment and upheld the BAAQMD's CEQA Guidelines. *California Building Industry Association versus Bay Area Air Quality Management District,* Case No. A135335 and A136212 (Court of Appeal, First District, August 13, 2013). In addition to the City's independent determination that use of the BAAQMD's CEQA Guidelines is supported by substantial evidence, they have been found to be valid guidelines for use in the CEQA environmental review process.

In addition, CEQA grants local agencies broad discretion to develop their own thresholds of significance, or to rely on thresholds previously adopted or recommended by other public agencies or experts so long as they are supported by substantial evidence. Accordingly, the City is using the BAAQMD's 2011 thresholds to evaluate project impacts in order to evaluate the potential effects of the project on GHG emissions.

Greenhouse Gas Emissions Criteria

BAAQMD has identified screening criteria and significance criteria for projects. As indicated at the beginning of this section, BAAQMD's project-level review criteria are applicable to specific plans like the proposed Specific Plan Update. If the Plan exceeds the Guidelines' GHG screening-level sizes identified in BAAQMD's CEQA Guidelines, the Plan is required to conduct a full GHG analysis using BAAQMD's significance criteria:

- Bright-line Threshold: 1,100 $MTCO_2e$ per year; or
- Per Capita Efficiency Target: 4.6 $MTCO_2e$ per service population (SP).

Land use development projects include residential, commercial, industrial, and public land use facilities. Direct sources of emissions may include on-site combustion of energy, such as natural gas used for heating and cooking, emissions from industrial processes (not applicable for most land use development projects), and fuel combustion from mobile sources. Indirect emissions are emissions produced off-site from energy production, water conveyance due to a project's energy use and water consumption, and non-biogenic emissions from waste disposal. Biogenic CO_2 emissions are not included in the quantification of a project's GHG emissions, because biogenic CO_2 is derived from living biomass (e.g. organic matter present in wood, paper, vegetable oils, animal fat, food, animal, and yard waste) as opposed to fossil fuels. Although GHG emissions from waste generation are included in the GHG inventory for the proposed Specific Plan Update, the efficiency threshold of 4.6 $MTCO_2e$ per service population identified above does not include the waste sector and therefore GHG emissions from waste is not considered in the per capita evaluation.

If the proposed Specific Plan Update does not exceed the *de minimus* bright-line threshold of 1,100 $MTCO_2e$ per year, it would be considered to have a less than cumulatively considerable GHG emissions impact. If the proposed Specific Plan Update exceeds this bright-line threshold, it would be compared to the per capita efficiency target of 4.6 $MTCO_2e$ per SP. Exceedance of the per capita efficiency target would result in a significant GHG emissions impact.

BAAQMD does not have thresholds of significance for construction-related GHG emissions, but requires quantification and disclosure of construction-related GHG emissions.

4.6.3 IMPACT DISCUSSION

4.6.3.1 METHODOLOGY

GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod), Version 2013.2. Transportation emissions are based on trip generation and vehicle miles traveled data provided by Fehr & Peers. Construction emissions are based on the construction schedule, preliminary list of construction equipment, demolition and soil haul volumes, and new buildings constructed onsite.

GHG-1	Implementation of the proposed Project would result in the substantial generation of construction-related GHG emissions and would either directly or indirectly have a significant impact on the environment.

Specific Plan Update

A project does not generate enough GHG emissions on its own to influence global climate change; therefore, GHG analyses measure a project's contribution to the cumulative environmental impact. Development allowed by the proposed Specific Plan Update would contribute to global climate change through direct and indirect emissions of GHGs from transportation sources, energy (natural gas and purchased energy), water use and wastewater generation, and solid waste generation. Annual GHG emissions were calculated for construction and operation of the proposed Specific Plan Update and are shown in Table 4.6-6.

TABLE 4.6-6 PROPOSED SPECIFIC PLAN UPDATE GREENHOUSE GAS EMISSIONS FORECAST

	GHG Emissions ($MTCO_2e$/Year)		
Category	Existing	Proposed Specific Plan Update	Increase from Existing
Construction Emissions			
Total Construction Emissions	—	40,048	N/A
30-Year Amortized Construction[a]	—	1,335	N/A
Operational Emissions			
Area	17	115	97
Energy	3,273	14,238	10,965
On-Road Mobile Sources	9,470	14,774	5,305
Waste	1,617	11,839	10,222
Water/Wastewater	99	404	304
Total	14,476	41,370	26,894

TABLE 4.6-6 PROPOSED SPECIFIC PLAN UPDATE GREENHOUSE GAS EMISSIONS FORECAST

	GHG Emissions ($MTCO_2e$/Year)		
Category	Existing	Proposed Specific Plan Update	Increase from Existing
Total without Waste[a]	12,859	29,531	16,672
BAAQMD Bright-Line Threshold	N/A	N/A	1,100
Exceeds Bright-Line Threshold?	—	—	Yes
Service Population (SP)	1,896[b]	12,980[c]	N/A
Per Capita Emissions ($MTCO_2e$/SP)	6.78	2.28	-4.6
BAAQMD Efficiency Threshold	—	4.6 $MTCO_2e$/SP	—
Exceeds BAAQMD Target?	—	No	—

Note: Emissions may not total 100 percent due to rounding. New buildings would be constructed to the 2013 Building & Energy Efficiency Standards (effective July 1, 2014). Assumes all fireplaces are gas-burning fireplaces in accordance with BAAQMD Regulation 6, Rule 3. Existing emissions are based on 2014 emission rates and Plan emissions are based on 2035 emission rates in CalEEMod in accordance with BAAQMD methodology.
a. BAAQMD did not include solid waste emissions when developing the per capita significance thresholds. Therefore, total GHG emissions with and without the Waste Generation sector are included. If these emissions are included in the analysis for the Plan, Plan per capita emissions would be 3.19 $MTCO_2e$/SP/yr.
b. Service population based on a projected 1,002 employees, 816 permanent residents, and 78 hotel patrons, which are included as they are a projected known quantity and would contribute to the overall emissions generated.
c. Service population based on a projected 7,600 employees, 4,640 permanent residents, and 740 hotel patrons, which are included as they are a projected known quantity and would contribute to the overall emissions generated.
Source: CalEEMod 2013.2.2.

Construction

BAAQMD does not have thresholds of significance for construction-related GHG emissions. GHG emissions from construction activities are one-time, short-term emissions and therefore, would generally not significantly contribute to long-term cumulative GHG emissions impacts. One-time, short -term emissions are converted to average annual emissions by amortizing them over the service life of a building. For buildings in general, it is reasonable to look at a 30-year timeframe as this is a typical interval before a new building requires the first major renovation.[41] As shown in Table 4.6-6, when amortized over an average 30-year project lifetime, average annual construction emissions associated with the Specific Plan Update would result in 1,335 $MTCO_2e$ of GHG emissions per year. This projected average annual amount would exceed BAAQMD's *de minimus* bright line threshold of 1,100 $MTCO_2e$. However, because construction activities are one time, short-term GHG emissions that cease when completed impacts would be *less than significant*.

Significance Without Mitigation: Less than significant.

[41] International Energy Agency (IEA), 2008. Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies for New Buildings.

Operational Phase

As shown in Table 4.6-6, implementation of the proposed Specific Plan Update would result in an increase in GHG emissions of 16,672 $MTCO_2e$/year as a result of an increase in development within the Specific Plan Area and would exceed bright-line significance threshold of 1,100$MTCO_2e$/year. However, implementation of the Specific Plan Update would not exceed BAAQMD's per capita significance threshold of 4.6 $MTCO_2e$/SP. In addition, the Specific Plan Update would improve the per capita efficiency by 4.6 $MTCO_2e$/SP compared to the existing land uses. Therefore, Specific Plan Update-related GHG emissions impacts would be *less than significant*.

Significance Without Mitigation: Less than significant.

TOD #1 Project

The development contemplated by the proposed TOD #1 project would contribute to global climate change through direct emissions of GHG from on-site area sources and vehicle trips associated with the proposed TOD #1 project, and indirectly through off-site energy production required for on-site activities, water use, and waste disposal. Annual GHG emissions were calculated for construction and operation of the proposed TOD #1 project and are shown in Table 4.6-7.

TABLE 4.6-7 TOD #1 PROJECT GHG EMISSIONS INVENTORY

	GHG Emissions ($MTCO_2e$/Year)	
Pollutant	TOD #1 Project	Percent of Emissions
Total Construction	2,338	N/A
30-Year Amortized Construction	78	N/A
Area Sources	34	<1%
Energy Use	2,935	27%
Mobile Sources	5,672	53%
Waste Generation	1,939	18%
Water/Wastewater	104	1%
Total With Waste Generation Emissions	10,684	100%
Total Without Waste Generation Emissions[a]	8,745	N/A
Bright-Line Threshold	1,100	N/A

TABLE 4.6-7 TOD #1 PROJECT GHG EMISSIONS INVENTORY

	GHG Emissions ($MTCO_2e$/Year)	
Pollutant	TOD #1 Project	Percent of Emissions
Exceeds Bright-Line Threshold?	Yes	N/A
Service Population[b]	2,473	N/A
Per Capita Emissions	3.54	N/A
Per Capita Threshold (MTCO2e/SP)	4.6	N/A
Exceeds Threshold?	No	N/A

Note: Emissions may not total to 100 percent due to rounding.
Source: CalEEMod 2013.2.2. Mobile-source emissions based on year 2020 emission rates.
a. BAAQMD did not include solid waste emissions when developing the per capita significance thresholds. Therefore, total GHG emissions with and without the Waste Generation sector are included. If these emissions are included in the analysis for the proposed Specific Plan Update, the proposed Specific Plan Update per capita emissions would be 4.32 $MTCO_2e$/SP/yr.
b. Service population based on a projected 1,148 employees and 1,325 permanent residents.

Construction

BAAQMD does not have thresholds of significance for construction-related GHG emissions. GHG emissions from construction activities are one-time, short-term emissions and therefore, would not significantly contribute to long-term cumulative GHG emissions impacts of the proposed TOD #1 project. One-time, short -term emissions are converted to average annual emissions by amortizing them over the service life of a building. For buildings in general, it is reasonable to look at a 30-year timeframe as this is a typical interval before a new building requires the first major renovation.[42] As shown in Table 4.6-7, when amortized over an average 30-year project lifetime, average annual construction emissions from the Project would represent a nominal source of GHG emissions and would not exceed BAAQMD's *de minimus* bright line threshold of 1,100 $MTCO_2e$. Construction emissions are *less than significant*.

Operational Phase

As shown in Table 4.6-7, development of the proposed TOD #1 project would result in an increase of GHG emissions of 8,745 $MTCO_2e$/year as a result of an increase in density on the project site and would exceed bright-line significance threshold of 1,100$MTCO_2e$/year. However, the proposed TOD #1 project would not exceed the per capita significance threshold of 4.6 $MTCO_2e$/SP. Therefore, TOD #1 project-related GHG emissions impacts would be *less than significant*.

Significance Without Mitigation: Less than significant.

[42] International Energy Agency.2008, March. Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies for New Buildings.

TOD #2 Project

Similar to the proposed TOD #1 project, the development contemplated by the proposed TOD #2 project would contribute to global climate change through direct emissions of GHG from on-site area sources and vehicle trips generated, and indirectly through off-site energy production required for on-site activities, water use, and waste disposal. Annual GHG emissions were calculated for construction and operation of the proposed TOD #2 project and shown in Table 4.6-8.

TABLE 4.6-8 TOD #2 PROJECT GHG EMISSIONS INVENTORY

	GHG Emissions ($MTCO_2e$/Year)	
Pollutant	TOD #2 Project	Percent of Emissions
Total Construction	3,428	N/A
30-Year Amortized Construction	114	N/A
Area Sources	22	<1%
Energy Use	2,237	23%
Mobile Sources	5,897	61%
Waste Generation	1,422	15%
Water/Wastewater	104	1%
Total With Waste Generation Emissions	9,681	100%
Total Without Waste Generation Emissions[a]	8,259	N/A
Screening-Level Threshold	1,100	N/A
Exceeds Screening-Level Threshold?	Yes	N/A
Service Population[b]	1,951	N/A

TABLE 4.6-8 TOD #2 PROJECT GHG EMISSIONS INVENTORY

	GHG Emissions ($MTCO_2e$/Year)	
Pollutant	TOD #2 Project	Percent of Emissions
Per Capita Emissions	4.23	N/A
Per Capita Threshold ($MTCO_2e$/SP)	4.6	N/A
Exceeds Threshold?	No	N/A

Note: Emissions may not total to 100 percent due to rounding.
Source: CalEEMod 2013.2.2. Mobile-source emissions based on year 2020 emission rates.
a. BAAQMD did not include solid waste emissions when developing the per capita significance thresholds. Therefore, total GHG emissions with and without the Waste Generation sector are included. If these emissions are included in the analysis for the proposed Specific Plan Update, the proposed Specific Plan Update per capita emissions would be 4.96 $MTCO_2e$/SP/yr.
b. Service population based on a projected 868 employees, 851 permanent residents, and 232 hotel patrons, which are included as they are a projected known quantity and would contribute to the overall emissions generated.

Construction

BAAQMD does not have thresholds of significance for construction-related GHG emissions. Annual average GHG emissions from construction activities are short term when amortized over a 30-year project lifetime would not significantly contribute to cumulative GHG emissions impacts of the proposed TOD #2 project. Therefore, TOD #2 project-related GHG emissions impacts during construction would be *less than significant*.

Operational Phase

As shown in Table 4.6-8, development of the proposed TOD #2 project would result in an increase of GHG emissions of 8,259 $MTCO_2e$/year and would exceed the bright-line significance threshold of 1,100$MTCO_2e$/year. However, the proposed TOD #2 project would not result in an exceedance of the per capita significance threshold of 4.6 $MTCO_2e$/SP. Therefore, TOD #2 project-related GHG emissions impacts would be *less than significant*.

Significance Without Mitigation: Less than significant.

GHG-2 **The proposed Project would not conflict with an applicable plan, policy, or regulation for the purpose of reducing the emissions of GHGs.**

The following describes the applicable state and regional GHG reduction plans that have been adopted.

CARB's Scoping Plan

In accordance with AB 32, CARB developed the Scoping Plan to outline the State's strategy to achieve 1990 level emissions by 2020. To estimate the reductions necessary, CARB projected statewide 2020 BAU GHG emissions (i.e. GHG emissions in the absence of statewide emission reduction measures). CARB identified that the State as a

whole would be required to reduce GHG emissions by 28.5 percent from 2020 BAU levels to achieve the target of AB 32.[43]As explained in Section 4.6.1.1 above, updated data indicates that the State would actually need to reduce GHG emissions by 21.7 percent from 2020 BAU. Furthermore, with implementation of the Pavley GHG emission standards for passenger vehicles and the 33 percent RPS for electricity, the State would need to reduce GHG emissions by 15.7 percent from 2020 conditions.[44]

Statewide strategies to reduce GHG emissions include the LCFS; California Appliance Energy Efficiency regulations; California Building Standards (i.e. CALGreen and the 2013 Building and Energy Efficiency Standards); California Renewable Energy Portfolio standard (33 percent RPS); changes in the corporate average fuel economy standards (e.g. Pavley I and Pavley II); and other measures that would ensure the State is on target to achieve the GHG emissions reduction goals of AB 32. Statewide GHG emissions reduction measures that are being implemented over the next six years would reduce the proposed Specific Plan Update's GHG emissions.

MTC's Plan Bay Area

To achieve ABAG's/MTC's sustainable vision for the Bay Area, the *Plan Bay Area* land use concept plan for the region concentrates the majority of new population and employment growth in the region in PDAs. PDAs are transit-oriented, infill development opportunity areas within existing communities. Overall, well over two-thirds of all regional growth by 2040 is allocated within PDAs. PDAs are expected to accommodate 80 percent (or over 525,570 units) of new housing and 66 percent (or 744,230) of new jobs.

Specific Plan Update

CARB's Scoping Plan

The GHG emissions reduction measures under the CARB Scoping Plan would be implemented on a statewide basis and would be applicable to projects accommodated within the proposed Specific Plan Area. Additionally, as shown in Table 4.6-6, the proposed Specific Plan Update would achieve BAAQMD's efficiency target. New residential and non-residential construction allowed under the proposed Specific Plan Update would achieve the current building and energy efficiency standards. The new buildings would be constructed in conformance with CALGreen, which requires high-efficiency water fixtures for indoor plumbing and water efficient irrigation systems.

MTC's Plan Bay Area

The Specific Plan Area encompasses the Millbrae Transit Station Area PDA in *Plan Bay Area*. The proposed Specific Plan Update promotes transit-oriented infill development and would increase residential and non-residential land use intensity near the Millbrae Station. Therefore, the proposed Specific Plan Update is consistent with the overall goals and land use concept in *Plan Bay Area*. Chapter 4.11, Land Use and Planning, of this Draft EIR also describes consistency with *Plan Bay Area*. As explained in the discussion for Impact LU-2, the mixed-use

[43] California Air Resources Board (CARB). October 2008. *Climate Change Proposed Scoping Plan, a Framework for Change.*

[44] California Air Resources Board (CARB), 2012. *Status of Scoping Plan Recommended Measures,* http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf.

and transit-oriented aspects of the proposed Specific Plan Update would provide an increase in mixed-use development near the Millbrae Station.

The proposed Specific Plan Update is consistent with State and regional GHG reduction planning efforts; therefore, this impact would be *less than significant.*

Significance Without Mitigation: Less than significant.

TOD #1 and TOD #2 Projects

CARB's Scoping Plan

The GHG emissions reduction measures under the CARB Scoping Plan would be implemented on a statewide basis and would applicable to the proposed TOD #1 and TOD #2 projects. As shown in Table 4.6-7, the proposed TOD #1 and TOD #2 projects would achieve BAAQMD's efficiency target. New residential and non-residential construction proposed under these two Projects would achieve the current building and energy efficiency standards. The new buildings would be constructed in conformance with CALGreen, which requires high-efficiency water fixtures for indoor plumbing and water efficient irrigation systems.

MTC's Plan Bay Area

The proposed TOD #1 and TOD #2 projects are within the Millbrae Transit Station Area PDA in *Plan Bay Area*. Both these projects promote transit-oriented infill development and would increase residential and non-residential land use intensity near the Millbrae Station. Therefore, these two Projects are consistent with the overall goals and land use concept in *Plan Bay Area*. Chapter 4.11, Land Use and Planning, of this Draft EIR also describes consistency with *Plan Bay Area*. As explained in the discussion for Impact LU-2, the mixed-use and transit-oriented aspects of the proposed TOD #1 and TOD #2 projects would provide an increase in mixed-use development near the Millbrae Station.

Overall, the proposed TOD #1 and TOD #2 projects are consistent with State and regional GHG reduction planning efforts; therefore, this impact would be *less than significant.*

Significance Without Mitigation: Less than significant.

4.6.4 CUMULATIVE IMPACTS

GHG-3	The proposed Project, in combination with past, present, and reasonably foreseeable projects, would result in significant cumulative impacts with respect to GHG emissions due to construction-related emissions.

As described above, GHG emissions related to the proposed Project is not confined to a particular air basin, but are dispersed worldwide. Therefore, the analysis of impacts in Section 4.6.3, Impact Discussion, above also addresses cumulative impacts. As identified in GHG-1, implementation of the proposed Project would not exceed BAAQMDs efficiency metric. Additionally, construction emissions associated with development of the proposed TOD #1 and TOD #2 projects would be minimal and are not considered to represent a substantial increase in GHG emissions. Consequently, GHG construction emissions impacts of the proposed Project are *less than significant*.

Significance Without Mitigation: Less than significant.

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