

4.4 GREENHOUSE GAS EMISSIONS

This section provides an overview of greenhouse gases (GHG) and evaluates the construction and operational impacts associated with MP 2035, the proposed project. Topics addressed include construction emissions and consistency with applicable GHG reduction plans and policies.

The section is organized as follows:

- **Regulatory Framework** describes the pertinent federal, state, and local laws and guidelines.
- **Existing Setting** provides a general summary and overview of the existing environment
- **Thresholds of Significance** lists the thresholds used in identifying significant impacts.
- **Impacts** discusses the methodology used to assess impacts, including an overall discussion of methodology and assumptions, followed by a listing of thresholds and how the MP 2035 is expected to perform for each of them.
- **Mitigation Measures** are identified as necessary and feasible to reduce identified significant adverse impacts.
- **Significance of Impacts after Mitigation** identifies residual impacts after application of mitigation measures.

GHG emissions refer to a group of emissions that are generally believed to affect global climate conditions. The greenhouse effect compares the Earth and the atmosphere surrounding it to a greenhouse with glass panes. The glass panes in a greenhouse let heat from sunlight in and reduce the amount of heat that escapes. GHGs, such as carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), keep the average surface temperature of the Earth close to 60 degrees Fahrenheit (°F). Without the natural greenhouse effect, the Earth's surface would be about 61°F cooler.¹

In addition to CO₂, CH₄, and N₂O, GHGs include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and water vapor. Of all the GHGs, CO₂ is the most abundant pollutant that contributes to climate change through fossil fuel combustion. In 2002, CO₂ comprised 83.3 percent of the total GHG emissions in California.² The other GHGs are less abundant but have higher global warming potential than CO₂. For example, the global warming potential for CO₂ is 1 while CH₄ is 21 and N₂O is 310.³ To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO₂, denoted as CO₂e. The CO₂e of CH₄ and N₂O represented 6.4 and 6.8 percent, respectively, of the 2002 California GHG emissions. Other high global warming potential gases represented 3.5 percent of these emissions.⁴ In addition, there are a number of human-caused emissions (e.g., carbon monoxide, nitrogen oxide, non-methane volatile organic compounds, and sulfur dioxide) that influence the formation or destruction of climate change pollutants.

REGULATORY FRAMEWORK

In response to growing scientific and political concern with global climate change, a series of federal and State laws have been adopted to reduce GHG emissions.

¹State of California Environmental Protection Agency Climate Action Team, *Climate Action Report to Governor Schwarzenegger and the California Legislator*, March 2006.

²California Environmental Protection Agency, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, March 2006, p. 11.

³USEPA, *Non CO₂ Gases Economic Analysis and Inventory - Global Warming Potentials and Atmospheric Lifetimes*, December 20, 2006.

⁴*Ibid.*

Federal

Supreme Court Ruling. The U.S. Supreme Court ruled in *Massachusetts v. Environmental Protection Agency*, 127 S.Ct. 1438 (2007), that CO₂ and other GHGs are pollutants under the federal Clean Air Act (CAA), which the United States Environmental Protection Agency (USEPA) must regulate if it determines they pose an endangerment to public health or welfare. On December 7, 2009, the USEPA Administrator made two distinct findings: 1) the current and projected concentrations of the six key GHGs in the atmosphere (i.e., CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆) threatens the public health and welfare of current and future generations; and 2) the combined emissions of these GHGs from motor vehicle engines contribute to GHG pollution which threatens public health and welfare.

Energy Independence and Security Act. The Energy Independence and Security Act of 2007 includes several key provisions that will increase energy efficiency and the availability of renewable energy, which will reduce GHG emissions as a result. First, this Act sets a Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel by 2022.⁵ Second, this Act increases Corporate Average Fuel Economy Standards to require a minimum average fuel economy of 35 miles per gallon for the combined fleet of cars and light trucks by 2020. Third, this Act includes a variety of new standards for lighting and for residential and commercial appliance equipment. The equipment includes residential refrigerators, freezers, refrigerator-freezers, metal halide lamps, and commercial walk-in coolers and freezers.

National Fuel Efficiency Policy. In addition on May 19, 2009, President Barack Obama announced a new National Fuel Efficiency Policy aimed at increasing fuel economy and reducing GHG pollution.⁶ This policy is expected to increase fuel economy by more than five percent by requiring a fleet-wide average of 35.5 miles per gallon by 2016 starting with model year 2012. However, federal fuel economy standards have not yet been promulgated to establish specific benchmarks.

State

California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Located in Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," these energy efficiency standards were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.⁷ The most recent update to Title 24 was adopted by the California Energy Commission on April 23, 2008. The requirement for when the 2008 standards must be followed is dependent on when the application for the building permit is submitted. If an application for a building permit is submitted on or after January 1, 2010, the 2008 standards must be met. The California Energy Commission adopted the 2008 changes to the Building Energy Efficiency Standards to respond to the mandates of Assembly Bill 32 and to pursue California energy policy that energy efficiency is the resource of first choice for meeting California's energy needs.

Assembly Bill 1493 (Pavley I). Assembly Bill 1493 (referred to as Pavley I), adopted in 2002, required the California Air Resource Board (CARB) to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light-duty trucks at a "maximum feasible and cost effective reduction" by January 1, 2005. Pavley I took effect for model years starting in 2009 and extending to 2016 and the Low Emission Vehicle (LEV) III GHG will cover 2017 to 2025. It is estimated that the

⁵According to the United States Energy Information Administration, 36 billion gallons of fuel represents approximately 26 percent of current gasoline consumption.

⁶The White House, Office of the Press Secretary, May 19, 2009, http://www.whitehouse.gov/the_press_office/President-Obama-Announces-National-Fuel-Efficiency-Policy/.

⁷The California Energy Commission, California's Energy Efficiency Standards for Residential and Nonresidential Buildings, Title 24, Part 6, of the California Code of Regulations, <http://www.energy.ca.gov/title24>.

standard will reduce climate change emissions by 30 percent in 2016 compared to the emissions in the same year without the standards⁸

In September 2002, Assembly Bill 1493 was enacted, requiring the development and adoption of regulations to achieve “the maximum feasible reduction of greenhouse gases” emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the State.

Senate Bill 1078, Senate Bill 107, and Executive Order (E.O.) S-14-08 (Renewables Portfolio Standard). Signed on September 12, 2002, Senate Bill 1078 required California to generate 20 percent of its electricity from renewable energy by 2017. Senate Bill 107, signed on September 26, 2006 changed the due date for this goal from 2017 to 2010, which was achieved by the State. On November 17, 2008, E.O. S-14-08, which established a Renewables Portfolio Standard target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. Increased use of renewable energy sources will decrease California’s reliance on fossil fuels, reducing emissions of GHG from the energy sector.

Executive Order (E.O.) S-3-05. On June 1, 2005, E.O. S-3-05 set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

E.O. S-3-05 calls for the Secretary of California Environmental Protection Agency (Cal-EPA) to be responsible for coordination of State agencies and progress reporting. A recent California Energy Commission report concludes, however, that the primary strategies to achieve this target should be major “decarbonization” of electricity supplies and fuels, and major improvements in energy efficiency.⁹

In response to the E.O. S-3-05, the Secretary of the Cal-EPA created the Climate Action Team (CAT). California’s CAT originated as a coordinating council and included the Secretaries of the Natural Resources Agency, and the Department of Food and Agriculture, and the Chairs of the Air Resources Board, Energy Commission, and Public Utilities Commission. The original council was an informal collaboration between the agencies to develop potential mechanisms for reductions in GHG emissions in the State.

The original mandate for the CAT was to develop proposed measures to meet the emission reduction targets set forth in E.O. S-3-05. The CAT has since expanded and currently has members from 18 State agencies and departments. The CAT also has ten working groups which coordinate policies among their members. The working groups and their major areas of focus are:

- Agriculture: Focusing on opportunities for agriculture to reduce GHG emissions through efficiency improvements and alternative energy projects, while adapting agricultural systems to climate change;
- Biodiversity: Designing policies to protect species and natural habitats from the effects of climate change;
- Energy: Reducing GHG emissions through extensive energy efficiency policies and renewable energy generation;
- Forestry: Coupling GHG mitigation efforts with climate change adaptation related to forest preservation and resilience, waste to energy programs and forest offset protocols;
- Land Use and Infrastructure: Linking land use and infrastructure planning to efforts to reduce GHG from vehicles and adaptation to changing climatic conditions;
- Oceans and Coastal: Evaluating the effects sea level rise and changes in coastal storm patterns on human and natural systems in California;
- Public Health: Evaluating the effects of GHG mitigation policies on public health and adapting public health systems to cope with changing climatic conditions;
- Research: Coordinating research concerning impacts of and responses to climate change in California;

⁸CARB, *Clean Air Standards - Pavley, Assembly Bill 1493*, May 6, 2013.

⁹California Energy Commission, *California’s Energy Future – The View to 2050*, May 2011.

- State Government: Evaluating and implementing strategies to reduce GHG emissions resulting from State government operations; and
- Water: Reducing GHG impacts associated with the State's water systems and exploring strategies to protect water distribution and flood protection infrastructure.

The CAT is responsible for preparing reports that summarize the State's progress in reducing GHG emissions. The most recent CAT Report was published in December 2010. The CAT Report discusses mitigation and adaptation strategies, State research programs, policy development, and future efforts.

Senate Bill 1 and Senate Bill 1017 (Million Solar Roofs). Senate Bill 1 and Senate Bill 1017 enacted in August 2006 sets a goal to install 3,000 megawatts of new solar capacity by 2017 - moving the state toward a cleaner energy future and helping lower the cost of solar systems for consumers. The Million Solar Roofs Program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving down costs over time. It provides up to \$3.3 billion in financial incentives that decline over time.

Assembly Bill 32. In September 2006, the California Global Warming Solutions Act of 2006, also known as Assembly Bill 32, was signed into law. Assembly Bill 32 focuses on reducing GHG emissions in California, and requires the CARB to adopt rules and regulations that would achieve GHG emissions equivalent to Statewide levels in 1990 by 2020. The CARB has determined that the total Statewide aggregated GHG 1990 emissions level and 2020 emissions limit is 427 million metric tons of CO₂e. The 2020 target reductions are currently estimated to be 174 million metric tons of CO₂e.

To achieve the goal, Assembly Bill 32 mandates that the CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce Statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved. Because the intent of Assembly Bill 32 is to limit 2020 emissions to the equivalent of 1990, it is expected that the regulations would affect many existing sources of GHG emissions and not just new general development projects. Senate Bill 1368, a companion bill to Assembly Bill 32, requires the California Public Utilities Commission and the California Energy Commission to establish GHG emission performance standards for the generation of electricity. These standards will also apply to power that is generated outside of California and imported into the State.

Assembly Bill 32 charges CARB with the responsibility to monitor and regulate sources of GHG emissions in order to reduce those emissions. On June 1, 2007, CARB adopted three discrete early action measures to reduce GHG emissions. These measures involved complying with a low carbon fuel standard, reducing refrigerant loss from motor vehicle air conditioning maintenance, and increasing methane capture from landfills.¹⁰ On October 25, 2007, CARB tripled the set of previously approved early action measures. The approved measures include improving truck efficiency (i.e., reducing aerodynamic drag), electrifying port equipment, reducing PFCs emissions from the semiconductor industry, reducing propellants in consumer products, promoting proper tire inflation in vehicles, and reducing SF₆ emissions from the non-electricity sector.

The CARB Assembly Bill 32 Scoping Plan (Scoping Plan) contains the main strategies to achieve the 2020 emissions cap. The Scoping Plan was developed by the CARB with input from the CAT and proposes a comprehensive set of actions designed to reduce overall carbon emissions in California, improve the environment, reduce oil dependency, diversify energy sources, and enhance public health while creating new jobs and improving the State economy. The GHG reduction strategies contained in the Scoping Plan include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. Key approaches for reducing GHG emissions to 1990 levels by 2020 include:

¹⁰California Air Resources Board, *Proposed Early Action Measures to Mitigate Climate Change in California*, April 20, 2007.

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a Statewide renewable electricity standard of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout the State, and pursuing policies and incentives to achieve those targets; and
- Adopting and implementing measures to reduce transportation sector emissions.

CARB has also developed the GHG mandatory reporting regulation, which required reporting beginning on January 1, 2008 pursuant to requirements of Assembly Bill 32. The regulation requires reporting for major facilities that make up the bulk of the stationary source emissions in California (i.e., facilities that generate more than 25,000 metric tons of CO₂ per year). Cement plants, oil refineries, electric generating facilities/providers, co-generation facilities, and hydrogen plants and other stationary combustion sources that emit more than 25,000 metric tons of CO₂ per year, make up 94 percent of the point source CO₂ emissions in California.

Senate Bill 1368. Senate Bill 1368, adopted September 19, 2006, directs the California Energy Commission and the California Public Utilities Commission to adopt a performance standard for GHG emissions for the future electricity used in California, regardless of whether it is generated in-state or purchased from other states.

E.O. S-1-07, the Low Carbon Fuel Standard. On January 18, 2007, E.O. S-1-07 was issued requiring a reduction of at least ten percent in the carbon intensity of California's transportation fuels by 2020. Regulatory proceedings and implementation of the Low Carbon Fuel Standard are CARB's responsibility. The Low Carbon Fuel Standard has been identified by CARB as a discrete early action item in the CARB Scoping Plan. CARB expects the Low Carbon Fuel Standard to achieve the minimum ten percent reduction goal; however, many of the early action items outlined in the Scoping Plan work in tandem with one another. To avoid the potential for double-counting emission reductions associated with Assembly Bill 1493 (see previous discussion), the Scoping Plan has modified the aggregate reduction expected from the Low Carbon Fuel Standard to 9.1 percent.

Assembly Bill 811. Assembly Bill 811, enacted July 21, 2008, authorizes California cities and counties to designate districts within which willing property owners may enter into contractual assessments to finance the installation of renewable energy generation and energy efficiency improvements that are permanently fixed to the property.

Senate Bill 375. Senate Bill 375, adopted in September 30, 2008, provides a means for achieving Assembly Bill 32 goals through the reduction in emissions by cars and light trucks. Senate Bill 375 requires Regional Transportation Plans (RTPs) prepared by metropolitan planning organizations (MPOs) to include Sustainable Communities Strategies (SCSs). In adopting Senate Bill 375, the Legislature found that improved coordination between land use planning and transportation planning is needed in order to achieve the GHG emissions reduction target of Assembly Bill 32. Further, the staff analysis for the bill prepared for the Senate Transportation and Housing Committee's August 29, 2008 hearing on Senate Bill 375 began with the following statement: "According to the author, this bill will help implement Assembly Bill 32 by aligning planning for housing, land use, transportation and greenhouse gas emissions for the 17 MPOs in the state."

Executive Order (E.O.) S-13-08. E.O. S-13-08, signed on November 14, 2008, directs California to develop methods for adapting to climate change impacts through preparation of a Statewide plan. In response to this order, the California Natural Resources Agency coordinated with ten State agencies, multiple scientists, a consulting team, and stakeholders to develop the first Statewide, multi-sector adaptation strategy in the country. The resulting report, 2009 California Climate Adaptation Strategy, summarizes the best-known science to assess the vulnerability of the State to climate change impacts, and outlines possible

solutions that can be implemented within and across State agencies to promote resiliency. This strategy is the first step in an evolving process to reduce California's vulnerability to climate change impacts.

Adaptation refers to efforts that prepare the State to respond to the impacts of climate change – adjustments in natural or human systems to actual or expected climate changes to minimize harm or take advantage of beneficial opportunities. California's ability to manage its climate risks through adaptation depends on a number of critical factors. These include its baseline and projected economic resources, technology, infrastructure, institutional support and effective governance, public awareness, access to the best available scientific information, sustainably-managed natural resources, and equity in access to these resources.

CEQA Guideline Amendments. California Senate Bill 97, adopted on August 24, 2011, required the Governor's Office of Planning and Research (OPR) to develop CEQA Guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." The CEQA Guidelines amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. Noteworthy revisions to the CEQA Guidelines include:

- Lead agencies should quantify all relevant GHG emissions and consider the full range of project features that may increase or decrease GHG emissions as compared to the existing setting;
- Consistency with the Scoping Plan is not a sufficient basis to determine that a project's GHG emissions would not be cumulatively considerable;
- A lead agency may appropriately look to thresholds developed by other public agencies, including CARB's recommended CEQA thresholds;
- To qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project. General compliance with a plan, by itself, is not mitigation;
- The effects of GHG emissions are cumulative and should be analyzed in the context of CEQA's requirements for cumulative impact analysis; and
- Given that impacts resulting from GHG emissions are cumulative, significant advantages may result from analyzing such impacts on a programmatic level. If analyzed properly, later projects may tier, incorporate by reference, or otherwise rely on the programmatic analysis.

Senate Bill 743. Senate Bill 743, adopted September 27, 2013, encourages land use and transportation planning decisions and investments that reduce vehicle miles traveled that contribute to GHG emissions, as required by Assembly Bill 32. Key provisions of Senate Bill 743 include reforming aesthetics and parking CEQA analysis for urban infill projects and eliminating the measurement of auto delay, including Level of Service (LOS), as a metric that can be used for measuring traffic impacts in transit priority areas. Senate Bill 743 requires OPR to develop revisions to the CEQA Guidelines establishing criteria for determining the significance of transportation impacts of projects within transit priority areas that promote the "...reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses". It also allows OPR to develop alternative metrics outside of transit priority areas.

California Green Building Code. The California Green Building Code, referred to as CalGreen, is the first Statewide green building code. It was developed to provide a consistent, approach for green building within California. Taking effect January 2011, CalGreen lays out minimum requirements for newly constructed buildings in California, which will reduce GHG emissions through improved efficiency and process improvements. It requires builders to install plumbing that cuts indoor water use by as much as 20 percent, to divert 50 percent of construction waste from landfills to recycling, and to use low-pollutant paints, carpets, and floors. CalGreen is updated every three years.

Regional

The South Coast Air Quality Management District (SCAQMD) adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan (AQMP). In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy.

SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds. In its October 2008 document, the SCAQMD proposed the use of a percent emission reduction target (e.g., 30 percent) to determine significance for commercial/residential projects that emit greater than 3,000 metric tons per year. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for stationary source/industrial projects where the SCAQMD is the lead agency. However, SCAQMD has yet to adopt a GHG significance threshold for land use development projects (e.g., residential/commercial projects) and has formed a GHG Significance Threshold Working Group to further evaluate potential GHG significance thresholds.

SCAQMD has convened a GHG CEQA Significance Threshold Working Group to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. Members of the working group include government agencies implementing CEQA and representatives from various stakeholder groups that will provide input to the SCAQMD staff on developing CEQA GHG significance thresholds. The working group is currently discussing multiple methodologies for determining project significance. These methodologies include categorical exemptions, consistency with regional GHG budgets in approved plans, a numerical threshold, performance standards, and emissions offsets.

Local

The City of Los Angeles has issued guidance promoting green building to reduce GHG emissions. The goal of the Green LA Action Plan (Plan) is to reduce GHG emissions 35 percent below 1990 levels by 2030.¹¹ The Plan identifies objectives and actions designed to make the City a leader in confronting global climate change. The measures would reduce emissions directly from municipal facilities and operations, and create a framework to address City-wide GHG emissions. The plan lists various focus areas in which to implement GHG reduction strategies. Focus areas listed in the plan include energy, water, transportation, land use, waste, port, airport, and ensuring that changes to the local climate are incorporated into planning and building decisions. The Green LA Action Plan discusses City goals for each focus area, as follows:

Energy

- Increase the generation of renewable energy;
- Encourage the use of mass transit;
- Develop sustainable construction guidelines;
- Increase City-wide energy efficiency; and
- Promote energy conservation.

Water

- Decrease per capita water use to reduce electricity demand associated with water pumping and treatment.

Transportation

- Power the City vehicle fleet with alternative fuels; and
- Promote alternative transportation (e.g., mass transit and rideshare).

Other Goals

- Create a more livable City through land use regulations;
- Increase recycling, reducing emissions generated by activity associated with the Port of Los Angeles and regional airports;
- Create more City parks, promoting the environmental economic sector; and
- Adapt planning and building policies to incorporate climate change policy.

¹¹City of Los Angeles, *Green LA: An Action Plan to Lead the Nation in Fighting Global Warming*, May 2007.

In order to provide detailed information on action items discussed in GreenLA, the City published an implementation document titled "ClimateLA". ClimateLA presents the existing GHG inventory for the City, includes enforceable GHG reduction requirements, provides mechanisms to monitor and evaluate progress, and includes mechanisms that allow the plan to be revised in order to meet targets. By 2030, the plan aims to reduce GHG emissions by 35 percent from 1990 levels which were estimated to be approximately 54.1 million metric tons.

Therefore, the City will need to lower annual GHG emissions to approximately 35.1 million metric tons per year by 2030. To achieve these reductions the City has developed strategies that focus on energy, water use, transportation, land use, waste, open space and greening, and economic factors. To reduce emissions from energy usage, ClimateLA proposes the following goals: increase the amount of renewable energy provided by the Los Angeles Department of Water and Power; present a comprehensive set of green building policies to guide and support private sector development; reduce energy consumed by City facilities and utilize solar heating where applicable; and help citizens to use less energy. With regard to waste, ClimateLA sets the goal of reducing or recycling 70 percent of trash by 2015. With regard to open space and greening, ClimateLA includes the following goals: create 35 new parks; revitalize the Los Angeles River to create open space opportunities; plant one million trees throughout the City; identify opportunities to "daylight" streams; identify promising locations for stormwater infiltration to recharge groundwater aquifers; and collaborate with schools to create more parks in neighborhoods.

The City has adopted the Los Angeles Green Building Code (LAGBC) to reduce the City's carbon footprint. The LAGBC is applicable to new buildings and alterations with building valuations over \$200,000 (residential and non-residential). The LAGBC is based on the 2010 California Green Building Standards Code, commonly known as "CALGreen" that was developed and mandated by the State to attain consistency among the various jurisdictions within the State; reduce the building's energy and water use; and reduce waste.

EXISTING SETTING

GHGs are the result of both natural and human-influenced activities. Forest fires, decomposition, industrial processes, landfills, consumption of fossil fuels for power generation, transportation, heating, and cooling are the primary sources of GHG emissions. Without human intervention, the Earth maintains an approximate, but varied, balance between the emission of GHGs into the atmosphere and the storage of greenhouse gases in oceans and terrestrial ecosystems. Increased combustion of fossil fuels (e.g., gasoline, diesel, coal, etc.) have contributed to the rapid increase in atmospheric levels of GHGs over the last 150 years.

The primary effect of rising global concentrations of atmospheric GHG levels is a rise in the average global temperature of approximately 0.2 degrees Celsius per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur given the expected rise in global atmospheric GHG concentrations from innumerable sources of GHG emissions worldwide (e.g., economically developed and developing countries and deforestation), which would induce further changes in the global climate system during the current century.¹² Adverse impacts from global climate change worldwide and in California include:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in atmospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;¹³

¹²See, e.g., Environmental Protection Agency, Draft Endangerment Finding, 74 Fed. Reg. 18886, 18904 (April 24, 2009) ("cumulative emissions are responsible for the cumulative change in the stock of concentrations in the atmosphere"); see also 74 Fed. Reg. 66496, 66538 (same in Final Endangerment Finding).

¹³*Ibid.*

- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets;¹⁴
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;¹⁵
- Declining Sierra Mountains snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;¹⁶
- Increasing the number of days conducive to ozone formation (e.g., clear days with intense sun light) by 25 percent to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st Century;¹⁷ and
- Increasing the potential for erosion of California’s coastlines and seawater intrusion into the Sacramento Delta and associated levee systems due to the rise in sea level.¹⁸

Scientific understanding of the fundamental processes responsible for global climate change has improved over the past decade. However, there remain significant scientific uncertainties, for example, in predictions of local effects of climate change, occurrence of extreme weather events, and effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. Due to the complexity of the climate system, the uncertainty surrounding the implications of climate change may never be completely eliminated. Because of these uncertainties, there continues to be significant debate as to the extent to which increased concentrations of GHGs have caused or will cause climate change, and with respect to the appropriate actions to limit and/or respond to climate change. In addition, it may not be possible to link specific development projects to future specific climate change impacts, though estimating project-specific impacts is possible.

State of California

California is the 15th largest emitter of GHG on the planet, representing about two percent of the worldwide emissions.¹⁹ **Table 4.4-1** shows the California GHG emissions inventory for years 2002 to 2011. The transportation sector – largely the cars and trucks that move people and goods – is the largest contributor to GHG emissions followed by electrical power. GHG emissions slightly decreased in 2009 due to a noticeable drop in on-road transportation, electricity generation, and industrial emissions.

TABLE 4.4-1: CALIFORNIA GREENHOUSE GAS EMISSIONS INVENTORY										
Sector	CO₂e Emissions (Million Metric Tons)									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Transportation	184	184	187	189	189	189	177	172	171	168
Electric Power	109	113	115	108	105	114	120	104	90	87
Commercial and Residential	43	42	44	43	43	44	45	44	45	45
Industrial	94	93	96	94	92	89	89	84	91	93
Recycling and Waste	6	6	6	6	6	7	7	7	7	7
Agriculture	32	33	33	33	34	33	34	32	32	32
High GWP	7	8	9	9	10	11	11	12	14	15
Emissions Total	476	479	489	482	479	486	486	455	450	448

SOURCE: CARB, *California Greenhouse Gas Inventory 2000-2011*, August 1, 2013.

¹⁴Intergovernmental Panel on Climate Change, “Climate Change 2007.”
¹⁵Intergovernmental Panel on Climate Change, “Climate Change 2007.”
¹⁶California Environmental Protection Agency, *Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature*. 2006.
¹⁷California Environmental Protection Agency, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. 2006.
¹⁸*Ibid.*
¹⁹California Air Resource Board, *Climate Change Scoping Plan*, December 2008.

THRESHOLDS OF SIGNIFICANCE

The proposed project would have a significant impact related to GHG emissions if it would:

- Increase GHG emissions compared to existing conditions (2013);
- Conflict with applicable plans, policies or regulations adopted for the purpose of reducing GHG emissions; or
- Conflict with Senate Bill 375 GHG emission reduction targets.

IMPACTS

Comparison to Existing Conditions

The GHG emissions resulting from the proposed project would be significant if the project caused an increase over existing (2013) levels. This impact threshold has been developed for use in this analysis based on CEQA's requirement that impacts be compared to existing conditions. However, since existing rates of GHG emissions are already harmful to the environment it is necessary that existing emissions be reduced in order to reduce climate change. The proposed project would change City-wide GHG emissions as a result in project-related changes to VMT. **Table 4.4-1**, above, summarizes changes in VMT among the Existing, Future No Project, and Future With Project scenarios on surface streets by Area Planning Commission (APC) and for the City as a whole. Under Existing conditions, motorists travel over 75 million vehicle miles on roadways within the City of Los Angeles on an average weekday. Under Future No Project conditions, daily VMT increases to 82.6 million, 8 percent above Existing Base levels. The increase occurs disproportionately on Freeways, where VMT increases by 8.3 percent, compared with surface streets, where VMT increases by 7.7 percent.

This analysis focuses on regional emissions associated with VMT. Regional VMT was estimated using an updated version of the City of Los Angeles' Travel Demand Model. The model developed for the MP 2035 is based on the Transportation Specific Plan (TSP) model, which utilizes the TransCAD Version 4.8 Build 500 modeling software and has been calibrated and validated for current conditions. Emissions rates were obtained from the CARB's EMFAC2011 model. Using EMFAC2011, emissions were estimated for VMT in five mile per hour increments from 0 to 65+ miles per hour.

GHG emissions would also be generated by construction activity associated with proposed enhancements. No specific enhancements have been proposed in this planning analysis, and an annualized quantification of construction emissions would be entirely speculative. In addition, construction-related GHG emissions would be a negligible percentage of total regional emissions when considering the emissions generated by mobile sources. For example, the RTP/SCS construction emissions presented for 2035 conditions in Los Angeles County were approximately 0.3 percent of mobile source emissions. These emissions included construction emissions from all development activity, not just transportation improvements. GHG emissions strictly from transportation projects would represent less than 0.3 percent of total emissions.

Table 4.4-2 shows the total GHG emissions for Existing Conditions, Future No Project, and Future With Project in each APC. It is anticipated that mobility enhancements associated with the proposed project would reduce GHG emissions by 4.3 million metric tons per year when compared to existing emissions (27 percent reduction) and would reduce GHG emissions by 123,130 metric tons per year when compared to Future No Project condition (1 percent reduction). **Table 4.4-3** shows the comparison of Future with Project emissions to Existing Conditions and Future No Project emissions. Although it is estimated that regional growth would result in increased regional VMT, the implementation of the GHG engine emission standards known as the Pavley Rules would substantially reduce tailpipe GHG emissions. Therefore, the proposed project would result in a less-than-significant impact related to existing GHG emissions.

TABLE 4.4-2: TOTAL GHG EMISSIONS	
Area Planning Commission	CO₂ (Metric Tons per Year)
EXISTING CONDITIONS	
1. North Valley	1,164,157
2. South Valley	1,419,245
3. Central	1,738,957
4. East Los Angeles	702,410
5. West Los Angeles	1,395,355
6. South Los Angeles	1,301,540
7. Harbor	400,803
<i>Surface Streets</i>	<i>8,122,465</i>
<i>Freeways (Mainline)</i>	<i>7,934,993</i>
Total, City of Los Angeles	16,057,459
FUTURE NO PROJECT	
1. North Valley	873,151
2. South Valley	1,005,383
3. Central	1,246,003
4. East Los Angeles	504,364
5. West Los Angeles	998,797
6. South Los Angeles	949,273
7. Harbor	290,224
<i>Surface Streets</i>	<i>5,867,195</i>
<i>Freeways (Mainline)</i>	<i>6,024,616</i>
Total, City of Los Angeles	11,891,811
FUTURE WITH PROJECT	
1. North Valley	849,977
2. South Valley	990,971
3. Central	1,181,378
4. East Los Angeles	465,941
5. West Los Angeles	984,657
6. South Los Angeles	899,636
7. Harbor	273,449
<i>Surface Streets</i>	<i>5,646,010</i>
<i>Freeways (Mainline)</i>	<i>6,122,671</i>
Total, City of Los Angeles	11,768,681
SOURCE: City of Los Angeles Travel Demand Model, 2013; CARB, EMFAC2011.	

GHG Reduction Plan Analysis

The primary regional plan designed to reduce GHG emission is the RTP/SCS. The proposed project would be consistent with applicable goals of the RTP/SCS. Specifically, the proposed project would encourage non-motorized transportation, including bicycling and walking. This would protect the environment and health of residents by improving air quality and encouraging active transportation. This would also be consistent with the RTP/SCS goal of encouraging land use and growth patterns that facilitate transit and non-motorized transportation. In addition, as shown above, the proposed project would reduce GHG emissions by 27 percent compared to existing conditions and 1 percent compared to future no project conditions. This is consistent with the intent of the RTP/SCS. The RTP/SCS included a detailed and quantitative assessment of regional compliance with Assembly Bill 32. A similar analysis is not relevant to the proposed project because the proposed project solely focuses on mobility enhancement while Assembly Bill 32 includes all sources of GHG emissions (e.g., solid waste decomposition and energy use).

TABLE 4.4-3: GHG EMISSIONS COMPARISON	
Area Planning Commission	CO₂ (Metric Tons per Year)
FUTURE WITH PROJECT (COMPARISON TO EXISTING)	
1. North Valley	(314,180)
2. South Valley	(428,273)
3. Central	(557,579)
4. East Los Angeles	(236,469)
5. West Los Angeles	(410,697)
6. South Los Angeles	(401,904)
7. Harbor	(127,354)
<i>Surface Streets</i>	<i>(2,476,455)</i>
<i>Freeways (Mainline)</i>	<i>(1,812,323)</i>
Total, City of Los Angeles	(4,288,778)
FUTURE WITH PROJECT (COMPARISON TO FUTURE NO PROJECT)	
1. North Valley	(23,174)
2. South Valley	(14,411)
3. Central	(64,625)
4. East Los Angeles	(38,423)
5. West Los Angeles	(14,140)
6. South Los Angeles	(49,638)
7. Harbor	(16,775)
<i>Surface Streets</i>	<i>(221,185)</i>
<i>Freeways (Mainline)</i>	<i>98,055</i>
Total, City of Los Angeles	(123,130)
SOURCE: City of Los Angeles Travel Demand Model, 2013; CARB, EMFAC2011.	

Implementation of the proposed project would occur within the 35 City of Los Angeles Community Plan areas (Community Plans). These Community Plans include several objectives that are applicable to the proposed project. These objectives can be summed up as follows:

- Increase capacity on existing transportation systems through minor physical improvements
- Promoting pedestrian & bicycle use/reduction of dependence on auto
- Maintaining a safe and efficient street network
- Promoting the use of transit

The proposed project would be consistent with Community Plan goals and objectives related to the promotion of pedestrian, transit and bicycle use. The proposed development of a citywide Enhanced Complete Street System included under the proposed project would outline modal enhancements for particular major streets in mode-specific enhanced networks that together create a system of complete streets that would improve the overall multimodal transportation system. The Enhanced Complete Street System would comprise four Enhanced Networks/Districts, one each to support pedestrian, bicycle, transit, and vehicle travel. This would also enable the proposed project to be consistent with policies and goals related to increasing capacity on existing transportation systems and with maintaining a safe and efficient street network. The proposed project would also be consistent with Green LA Action Plan by encourage the use of mass transit and reducing future with project emissions from existing emissions. Therefore, the proposed project would result in a less-than-significant impact related to existing GHG reduction plans.

Senate Bill 375 Analysis

As described in the Regulatory Framework above, Senate Bill 375 requires CARB to develop regional CO₂ emission reduction targets, compared to 2005 emissions, for cars and light trucks only for 2020 and 2035 for each of the State’s MPOs. Each MPO is to prepare an SCS as part of the RTP in order to reduce CO₂ by

better aligning transportation, land use, and housing. For SCAG, the targets are to reduce per capita emissions 8 percent below 2005 levels by 2020 and 13 percent below 2005 levels by 2035. **Table 4.4-4** summarizes changes in vehicle miles traveled on a per-capita basis by dividing total vehicle miles traveled in the City of Los Angeles by the total number of people in the City, including both residents and workers. Under Existing conditions, motorists in the City of Los Angeles travel a daily average of 13.0 miles per capita. Under Future No Project conditions, daily VMT per capita increases to 13.3 miles, 2.1 percent above Existing levels. Future With Project conditions reduce daily VMT per capita to 13.0 miles, comparable to Existing levels and 2.0 percent lower than Future No Project levels.

TABLE 4.4-4: VEHICLE MILES TRAVELED PER CAPITA (EMPLOYMENT PLUS POPULATION) IN THE CITY OF LOS ANGELES						
Area Planning Commission	Vehicle Miles Traveled			Percent Change		
	Peak Period (7-Hour)	Off Peak Period (17-Hour)	Daily	Peak Period (7-Hour)	Off Peak Period (17-Hour)	Daily
EXISTING CONDITIONS						
1. North Valley	4.0	2.4	6.4	–	–	–
2. South Valley	3.7	2.4	6.1	–	–	–
3. Central	3.1	1.9	5.0	–	–	–
4. East Los Angeles	3.4	1.9	5.3	–	–	–
5. West Los Angeles	4.3	3.1	7.4	–	–	–
6. South Los Angeles	4.1	2.3	6.5	–	–	–
7. Harbor	4.2	2.9	7.1	–	–	–
<i>Surface Streets</i>	3.7	2.4	6.1	–	–	–
<i>Freeways (Mainline)</i>	3.4	3.4	6.9	–	–	–
Total, City of Los Angeles	7.2	5.8	13.0	–	–	–
FUTURE NO PROJECT (COMPARISON TO EXISTING)						
1. North Valley	4.1	2.6	6.7	2.8%	6.8%	4.3%
2. South Valley	3.6	2.4	6.0	-2.3%	0.4%	-1.2%
3. Central	3.0	1.9	5.0	-1.6%	0.5%	-0.8%
4. East Los Angeles	3.5	2.0	5.5	2.9%	4.8%	3.6%
5. West Los Angeles	4.2	3.0	7.2	-2.8%	-2.9%	-2.8%
6. South Los Angeles	4.2	2.4	6.6	0.8%	3.6%	1.8%
7. Harbor	4.6	3.2	7.8	8.0%	12.7%	9.9%
<i>Surface Streets</i>	3.7	2.4	6.2	0.1%	2.5%	1.0%
<i>Freeways (Mainline)</i>	3.5	3.6	7.1	0.7%	5.4%	3.0%
Total, City of Los Angeles	7.2	6.0	13.3	0.4%	4.2%	2.1%
FUTURE WITH PROJECT (COMPARISON TO EXISTING)						
1. North Valley	3.9	2.6	6.5	-1.3%	4.5%	0.9%
2. South Valley	3.5	2.4	5.9	-5.2%	-1.1%	-3.6%
3. Central	2.8	1.9	4.7	-9.0%	-2.8%	-6.6%
4. East Los Angeles	3.2	1.8	5.0	-7.3%	-4.3%	-6.2%
5. West Los Angeles	4.1	3.0	7.0	-5.8%	-4.6%	-5.3%
6. South Los Angeles	3.8	2.3	6.1	-7.2%	-1.6%	-5.2%
7. Harbor	4.2	3.0	7.2	-1.4%	6.2%	1.7%
<i>Surface Streets</i>	3.5	2.3	5.9	-5.6%	-0.9%	-3.8%
<i>Freeways (Mainline)</i>	3.5	3.6	7.1	1.5%	5.3%	3.4%
Total, City of Los Angeles	7.0	6.0	13.0	-2.2%	2.8%	0.0%
FUTURE WITH PROJECT (COMPARISON TO FUTURE NO PROJECT)						
1. North Valley	3.9	2.6	6.5	-4.0%	-2.1%	-3.3%
2. South Valley	3.5	2.4	5.9	-2.9%	-1.5%	-2.4%
3. Central	2.8	1.9	4.7	-7.5%	-3.3%	-5.8%
4. East Los Angeles	3.2	1.8	5.0	-9.9%	-8.7%	-9.5%
5. West Los Angeles	4.1	3.0	7.0	-3.1%	-1.7%	-2.5%
6. South Los Angeles	3.8	2.3	6.1	-7.9%	-5.0%	-6.9%
7. Harbor	4.2	3.0	7.2	-8.7%	-5.8%	-7.5%
<i>Surface Streets</i>	3.5	2.3	5.9	-5.7%	-3.3%	-4.8%
<i>Freeways (Mainline)</i>	3.5	3.6	7.1	0.8%	0.0%	0.4%
Total, City of Los Angeles	7.0	6.0	13.0	-2.6%	-1.3%	-2.0%

SOURCE: City of Los Angeles Travel Demand Model, 2013.

Determining the per capita CO₂ emissions requires modeling VMT by passenger vehicles and light trucks that emit CO₂ and dividing that number by the total population. The transportation analysis for the proposed project focused on 2035 VMT. The RTP/SCS concluded that, in 2035, regional per capita CO₂ emissions

would be 20.5 pounds per day, which was determined to be consistent with the Senate Bill 375. It is anticipated that passenger vehicles and light trucks will represent 73 percent of the VMT estimated for the proposed project in 2035. The CO₂ emissions related to passenger vehicles and light trucks would be 43,277,412 pounds per day. SCAG projects that the population of the City of Los Angeles will be 4,416,000 in 2035. The per capita emission rate for passenger vehicles and light trucks would be 9.8 pounds per day, which would be substantially less than the SCAG projection of 20.5 pounds per day. Therefore, the proposed project would result in a less-than-significant impact related to Senate Bill 375.

MITIGATION MEASURES

Impacts related to GHG emissions would be less than significant. No mitigation measures are required.

SIGNIFICANCE OF IMPACTS AFTER MITIGATION

Impacts related to GHG emissions were determined to be less than significant without mitigation.

CUMULATIVE IMPACTS

The analysis above demonstrates that project-related GHG emissions would be less than Existing and Future No Project emissions. In addition, the proposed project would be consistent with GHG reduction plans and Senate Bill 375 targets established in the RTP/SCS. Therefore, the proposed project would not contribute to a cumulative impact related to GHG emissions.