

3.7 GREENHOUSE GAS EMISSIONS

This section provides a description of global climate change, greenhouse gas (GHG) emissions, the existing regulatory framework surrounding GHG emissions, and an analysis of the potential impacts related to GHG emissions that would result from implementation of the project. The GHG emissions associated with construction and operation of the project are quantified and analyzed in the context of the evolving GHG/climate change regulatory environment. The results of the GHG emission calculations and estimates are provided in Appendix B.

3.7.1 EXISTING ENVIRONMENTAL SETTING

Scientific Basis of Climate Change

Certain gases in Earth's atmosphere, classified as GHGs, play a critical role in determining Earth's surface temperature. Solar radiation enters Earth's atmosphere from space. A portion of the radiation is absorbed by Earth's surface and a smaller portion of this radiation is reflected back toward space. The absorbed radiation is emitted from Earth as low-frequency infrared radiation; however, the infrared radiation is absorbed by GHGs in the atmosphere. As a result, the radiation that otherwise would have escaped back into space is instead "trapped" in the atmosphere, resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it.

Key GHGs contributing to the greenhouse effect are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons, chlorofluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of Earth's climate, known as global climate change or global warming. It is unlikely that global climate change of the past 50 years can be explained without acknowledging the contribution from human activities (IPCC 2007).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have much longer atmospheric lifetimes of 1 year to several thousand years, which allow GHGs to be dispersed around Earth.

When accounting for GHGs, emissions are expressed in terms of CO₂ equivalents (CO₂e). The concept of CO₂-equivalency is used to account for the different global warming potential (GWP) of GHGs to absorb infrared radiation. The GWP of a GHG is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. Expressing emissions in CO₂e takes the contributions of all GHG emissions and converts them to a single unit equivalent to the effect that would occur if only CO₂ were being emitted. The reference gas for GWP is CO₂; therefore, CO₂ has a GWP of 1. The other main GHGs that have been attributed to human activity include CH₄, which has a GWP of 21, and N₂O, which has a GWP of 310. Table 3.7-1 presents the GWP and atmospheric lifetimes of common GHGs.

**Table 3.7-1
Global Warming Potentials and Atmospheric Lifetimes of GHGs**

GHG	Formula	100-Year Global Warming Potential ¹	Atmospheric Lifetime (Years)
Carbon Dioxide	CO ₂	1	Variable
Methane	CH ₄	21	12±3
Nitrous Oxide	N ₂ O	310	120
Sulfur Hexafluoride	SF ₆	23,900	3,200

¹ GWPs are from the IPCC Second Assessment Report and are used by ARB in the statewide inventory.

Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood by scientists who study atmospheric chemistry that more CO₂ is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO₂ emissions, approximately 54% is sequestered within 1 year through ocean uptake, by northern hemisphere forest regrowth, and other terrestrial sinks; the remaining 46% of human-caused CO₂ emissions remains stored in the atmosphere (Seinfeld and Pandis 1998).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and TACs. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice it to say, the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climate. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

Greenhouse Gas Emission Sources

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, electric utility, residential, commercial, and agricultural sectors. Emissions of CO₂ are byproducts of fossil fuel combustion while CH₄, a highly potent GHG, is the primary component in natural gas and also is associated with agricultural practices and landfills. N₂O is also largely attributable to agricultural practices and soil management.

Global GHG Emissions

The United Nations estimated that worldwide emissions in 2007 were 22.7 billion metric tons (MT) CO₂e, of which the United States contributed the greatest percentage after China. Their data indicates the top 10 emitters (by country or area) contribute 67 percent of global emissions.

California GHG Emissions

The California Air Resources Board (ARB) performs an annual GHG inventory for emissions and sinks of the six major GHGs listed above. In 2008, California produced 484 million gross metric tons (MT) of CO₂e (ARB 2009). The inventory is divided into seven broad sectors and categories in the inventory: Agriculture, Commercial, Electricity Generation, Forestry, Industrial, Residential, and Transportation. Transportation was the sector with the largest percentage of GHG emissions, 37 percent, followed by electricity generation (25 percent), and industrial sources (20 percent). The remaining sectors each accounted for less than 10 percent of overall emissions. In addition to the State of California GHG Inventory, more specific regional GHG inventories have been prepared for on-road mobile sources and land use emissions.

San Diego County GHG Emissions

The University of San Diego School of Law Energy Policy Initiative Center prepared a GHG inventory for San Diego County (Anders et al. 2008). The inventory included estimates of GHG emissions for 1990, 2006, and 2020. Total GHG emissions in San Diego County for the year 2006 are estimated at 34 MMT of CO₂e. Transportation is the largest emissions sector, accounting for 16 MMT of CO₂e, or 46% of total emissions. Energy consumption, including electricity and natural gas use, is the next largest source of emissions at 34% of the total.

Adaptation to Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature is expected to increase by 3–7°F by the end of the century, depending on future GHG emission scenarios (IPCC 2007). Potential effects of climate change include loss of snowpack, changes in precipitation, increased temperatures, sea level rise, and increased wildfires. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state (including the project site). An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be stored as snow in the Sierra Nevada until spring could flow into the Central Valley concurrently with winter storm events. This scenario would place more pressure on California's levee/flood control system (DWR 2006).

Another outcome of global climate change is sea level rise. Sea levels rose approximately 7 inches during the last century and are predicted to rise an additional 7–22 inches by 2100, depending on the future levels of GHG emissions (IPCC 2007). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion, and disruption of wetlands (CEC 2006). As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some

species would become extinct or be extirpated from the state if suitable climate conditions are no longer available.

3.7.2 REGULATORY SETTING

Federal Plans, Policies, Regulations, and Laws

USEPA is the federal agency responsible for implementing the federal CAA. The Supreme Court of the United States ruled on April 2, 2007, that CO₂ is an air pollutant as defined under the CAA, and that USEPA has the authority to regulate emissions of GHGs.

Proposed Endangerment and Cause or Contribute Findings for GHG under the CAA

On December 7, 2009, USEPA signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)—in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing USEPA's proposed greenhouse gas emission standards for light-duty vehicles, which USEPA proposed in a joint proposal including the Department of Transportation's proposed CAFE standards on September 15, 2009.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, USEPA published the Final Mandatory Greenhouse Gas Reporting Rule (Reporting Rule) in the Federal Register. The Reporting Rule requires reporting of GHG data and other relevant information from fossil fuel and industrial GHG suppliers, vehicle and engine manufacturers, and all facilities that would emit 25,000 MT or more of CO₂e per year. Facility owners are required to submit an annual report with detailed calculations of facility GHG emissions due on March 31 for emissions in the previous calendar year. The Reporting Rule would also mandate recordkeeping and administrative requirements to enable USEPA to verify the annual GHG emissions reports. Owners of existing facilities that commenced operation prior to January 1, 2011, would be required to submit an annual report for calendar year 2011.

State Plans, Policies, Regulations, and Laws

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the CCAA.

Assembly Bill (AB) 1493

AB 1493, signed in 2002, required that ARB develop and adopt by January 1, 2005, regulations that achieve “the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state.”

In 2004, ARB adopted standards requiring automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), and beginning with the 2009 model year. For passenger cars and light-duty trucks, the GHG emission limits for the 2016 model year are approximately 37% lower than the limits for the first year of the regulations, the 2009 model year. Before the regulations could go into effect, US EPA had to grant California a waiver under the CAA, allowing California to regulate GHG emissions from motor vehicles within the state. USEPA granted the waiver in 2009.

In April 2010, the U.S. Department of Transportation (DOT) and USEPA established GHG gas emission and fuel economy standards for model year 2012–2016 light-duty cars and trucks. In the fall of 2010, California accepted compliance with these federal GHG standards as meeting similar state standards as adopted in 2004, resulting in the first coordinated national program. On January 24, 2011, DOT, USEPA, and the State of California announced a single timeframe for proposing fuel economy and GHG standards for model year 2017–2025 cars and light-duty trucks. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO₂ per mile in model year 2016, which is equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO₂ level solely through fuel economy improvements.

Executive Order S-3-05

Executive Order S-3-05, signed in June 2005, proclaimed that the State of California is vulnerable to the impacts of climate change. Executive Order S-3-05 declared that increased temperatures could reduce the Sierra Nevada’s snowpack, further exacerbate California’s air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

Executive Order S-3-05 directed the Secretary of Cal/EPA to coordinate a multi-agency effort to reduce GHG emissions to the target levels and to submit biannual reports to the Governor and the State

Legislature describing progress made toward reaching the emission targets, impacts of global warming on California's resources, and mitigation and adaptation plans to combat these impacts. The Secretary of Cal/EPA created the California Climate Action Team (CCAT), made up of members from various state agencies and commissions, which responsible for implementing global warming emissions reduction programs. CCAT is also responsible for reporting on the progress made toward meeting the statewide GHG targets.

AB 32 Climate Change Proposed Scoping Plan

In December 2008, ARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which contains the main strategies California will implement to achieve reduction of approximately 169 million metric tons (MMT) of CO₂e, or 28% from California's projected 2020 emission level of 596 MMT of CO₂e under a business-as-usual scenario. The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of California's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (31.7 MMT CO₂e);
- the Low-Carbon Fuel Standard (15.0 MMT CO₂e);
- energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems (26.3 MMT CO₂e); and
- a renewable portfolio standard for electricity production (21.3 MMT CO₂e).

ARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the Scoping Plan does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions.

Executive Order S-1-07

Executive Order S-1-07, signed in 2007, establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10% by 2020. ARB identified this Low Carbon Fuel Standard (LCFS) as a discrete early action item under AB 32, and the final ARB resolution (No. 09-31) was issued on April 23, 2009.

SB 97

Signed in August 2007, SB 97 acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the California Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Natural Resources Agency, guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions under CEQA. On February 16, 2010, the Office of Administrative Law approved the CEQA amendments and filed them with the Secretary of State

for inclusion in the California Code of Regulations. The CEQA amendments became effective on March 18, 2010. The amended guidelines establish two new guidance questions in the Environmental Checklist of the CEQA Guidelines Appendix G. The amendments do not establish a GHG emission threshold, and allow a lead agency to develop, adopt, and apply its own threshold of significance or those developed by other agencies or experts.

SB 375

Signed in September 2008, SB 375 aligns regional transportation planning efforts, regional GHG-reduction targets, and land use and housing allocation. It requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which would prescribe land use allocations in that MPO's Regional Transportation Plan (RTP). ARB has established reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets are to be updated every 8 years but can be updated every 4 years if advancements in emission technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG-reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.

SB 375 also extends the minimum time period for the Regional Housing Needs Allocation cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City or county land use policies (including General Plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA would incentivize qualified projects that are consistent with an approved SCS or APS, which would be categorized as "transit priority projects." ARB adopted regional targets on September 23, 2010 (ARB 2010).

Local Plans, Policies, and Laws

ARB's Scoping Plan (ARB 2008) states that local governments are "essential partners" in the effort to reduce GHG emissions. The Scoping Plan also acknowledges that local governments have "broad influence and, in some cases, exclusive jurisdiction" over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Many of the proposed measures to reduce GHG emissions rely on local government actions. The Scoping Plan encourages local governments to reduce GHG emissions by approximately 15% from current levels by 2020 (ARB 2008).

San Diego Air Pollution Control District

SDAPCD has no regulations relative to GHG emissions.

3.7.3 THRESHOLDS FOR DETERMINING SIGNIFICANCE

The impact of the proposed project related to GHG emissions would be considered significant if it would exceed the following thresholds of significance, in accordance with Appendix G of the CEQA Guidelines:

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

With regard to emissions of GHGs, neither SDAPCD nor the City of San Marcos have adopted a significance threshold for analyzing GHG emissions from plans or development projects or a methodology for analyzing impacts related to global warming as of the writing of this document. By adopting AB 32, the California Legislature has indicated that global climate change is a serious environmental issue and has identified a statewide GHG emissions target. To meet the goals of AB 32, California would need to generate fewer GHGs than current levels. It is recognized, however, that for most development projects, there is no simple metric available to determine whether the individual project would substantially increase or decrease overall emission levels of GHGs.

The legislation dealing with climate change in California (as well as international treaties and agreements on the subject) identifies goals for the rate of emissions of GHGs, relative to specific benchmark years. In the case of California, AB 32 requires 1990 GHG emission levels to be achieved by the year 2020, or about a 28% reduction from current emissions levels (ARB 2008). Neither state legislation nor executive order suggests that California intends to limit population growth to reduce the state's GHG emission levels. Therefore, the intent is to accommodate population growth in California, but achieve a lower rate of GHGs despite this larger population. In other words, California jurisdictions must become more GHG efficient.

For the purposes of this analysis, the sum of the number of jobs and the number of residents at a point in time is termed the "service population." Emission rates per service population can show how GHG-efficient new development and existing development must be in order to achieve AB 32 targets for land use-related sectors.

The BAAQMD has adopted a 2020 service population metric of 6.6 MT CO₂e per service population per year (BAAQMD 2010). The South Coast Air Quality Management District (SCAQMD) Working Group has proposed several possible thresholds for analysis of general and area plan impacts, including a 2020 service population metric of 6.6 MT CO₂e/SP/yr (SCAQMD 2009), which is consistent with the significance threshold for General Plans adopted by the BAAQMD. These efficiency thresholds were developed based on the statewide GHG inventory and statewide emission reduction goals of AB 32. The working group has also proposed a 2035 service population (SP) metric of 4.1 MT CO₂e/SP/year for General Plans. For purposes of this analysis, a 2030 GHG efficiency threshold of 4.9 MT CO₂e/SP/year was interpolated from the proposed 2020 and 2035 thresholds to coincide with the planning horizon of the proposed General Plan. These proposed significance thresholds are used within this EIR.

Thus, if the proposed General Plan meets the 2020 GHG efficiency threshold of 6.6 MT CO₂e/SP/yr, it would accommodate growth in a manner that does not conflict with the Scoping Plan and would not hinder California's ability to achieve AB 32 emission reduction targets. If the proposed General Plan does

not meet the 2030 GHG efficiency threshold of 4.9 MT CO₂e/SP/yr, it would result in significant GHG emissions.

At the time of this writing, no federal, state, regional, or local air quality regulatory agency has adopted a quantitative threshold of significance for construction-related GHG emissions.

3.7.4 ANALYSIS OF ENVIRONMENTAL IMPACTS

Generation of GHG Emissions

Construction-Related

GHG emissions generated by construction would be primarily in the form of CO₂. Although emissions of other GHGs, such as CH₄ and N₂O, are important with respect to global climate change, the emission levels of these other GHGs from on- and off-road vehicles used during construction are relatively small compared with the level of CO₂ emissions, even when factoring in the relatively larger global warming potential of CH₄ and N₂O.

Construction-related GHG exhaust emissions would be generated by sources such as heavy-duty off-road equipment, trucks hauling materials to the site, and worker commutes. Construction activities are anticipated to commence as early as 2011 and last until approximately 2030. Exhaust emission rates of the construction equipment fleet in California are expected to decrease over time due to efforts led by ARB. It is anticipated, however, that in later years, advancements in engine technology, retrofits, and turnover in the equipment fleet would result in increased fuel efficiency, potentially more alternatively fueled equipment, and lower levels of GHG emissions.

Construction-generated exhaust emissions would be temporary and short term in that they would only occur during the buildout period. In addition, the regulatory environment that continues to evolve under the mandate of AB 32 is expected to reduce some of the GHG emissions from construction activity. ARB's Scoping Plan does not directly discuss GHG emissions generated by construction activity; however, it does recommend measures for improving the efficiency of medium- and heavy-duty on-road vehicles and efficiency strategies for off-road vehicles (e.g., forklifts, bulldozers). In addition, existing programs for air quality improvement in California, including the Diesel Risk Reduction Plan and the 2007 State Implementation Plan, will result in the accelerated phase-in of cleaner technology for virtually all of California's diesel engine fleets, including construction equipment (ARB 2008). Measures implemented under these plans are likely to result in future fleets of construction equipment that are more GHG efficient than existing fleets. For these reasons, levels of GHG emissions associated with construction activity are expected to decrease over time as new regulations are developed under the mandate of AB 32.

Neither ARB nor SDAPCD directly discuss how to evaluate GHG emissions generated by construction activity and SDAPCD does not have a quantitative threshold of significance for construction-related GHG emissions; therefore, the threshold is based on a qualitative evaluation of whether the project implements

applicable best management practices (BMPs) for reducing GHG emissions related to construction activities.

Nonetheless, construction-generated GHG emissions resulting from the proposed General Plan would make an incremental contribution to GHGs that cause climate change. Although the construction activity would be temporary, GHGs as a result of those activities would persist in the atmosphere. Existing regulatory efforts and new regulations that are expected to be enacted under AB 32 will help reduce GHG emissions generated by construction activity throughout the state. However, given the information available today, GHG emissions associated with the construction allowed pursuant to the proposed project would be a program-level impact and would also contribute to this **significant impact**.

The City of San Marcos has not developed a CAP or a similar GHG emissions reduction plan for GHG emission-generating activity in its jurisdiction. However, the Conservation and Open Space Element of the proposed General Plan includes policies that would contribute to reducing GHG emissions. These policies include participation in regional efforts to reduce GHGs; quantifying community-wide and municipal greenhouse gas emissions to set a reduction goal and monitor progress; encourage energy conservation and the use of alternative energy sources; promote energy efficiency and conservation through design, construction, maintenance and operation of public and private facilities, infrastructure and equipment; requiring all City facilities and services to incorporate energy and resource conservation standards and practices; encouraging and supporting the generation, transmission and use of renewable energy; and encouraging retrofitting of existing buildings rather than demolition.

Implementation of the proposed General Plan policies would reduce GHG emission impacts. However, at this program level analysis impacts would remain **significant**; mitigation is required.

Operational

Operational GHG emissions may be both direct and indirect emissions and would be generated by area, mobile, and stationary sources. Area-source emissions would be associated with activities such as maintenance of landscaping and grounds. Natural gas combustion for space and water heating is also a direct area source of GHG emissions but is considered separately from other area sources. Lastly, solid waste disposal and wastewater treatment from residential and commercial uses would result in direct, off-site emissions of GHGs. Mobile-source emissions of GHGs would include project-generated vehicle trips by residents.

Indirect emissions sources include stationary-source emissions from electricity generation at off-site utility providers. Consumption of water would also result in indirect GHG emissions because of the electricity consumption associated with the off-site conveyance, distribution, and treatment of water and wastewater.

GHG emissions were estimated consistent with acceptable methodology and models, including the CalEEMod, Version 2011.1.1. CalEEMod estimates operational GHG emissions associated with development of a project, including transportation, electricity, natural gas, solid waste, water and

wastewater, and area source (e.g., landscaping) emissions. Vehicle fleet characteristics, energy consumption, waste generation, and water use and wastewater generation data specific to San Diego County, or project-specific data, were used in place of CalEEMod defaults, where available.

Because AB 32 defines a quantifiable goal of reducing emissions to the 1990 level by year 2020, operational GHG emissions from implementation of the rezone were estimated and compared to the proposed threshold of significance. GHG emissions were modeled for 2030 based on land uses identified in the proposed General Plan. Land uses for 2020 were interpolated based on a linear progression toward buildout in 2030. Table 3.7-2 presents operational emissions estimated for 2020 and 2030.

**Table 3.7-2
San Marcos General Plan – Operational GHG Emissions**

Emissions Source	2020	2030
	MT CO ₂ e	MT CO ₂ e
Area Source	20,094	21,822
Energy	259,734	317,788
Transportation	765,288	973,475
Solid Waste	67,423	70,449
Water & Wastewater	256,685	239,686
Total	1,369,225	1,623,220
Population	110,109	128,040
Employment	52,738	65,234
Service Population (Population+Employment)	162,847	193,274
CO ₂ e Per Capita	12.4	12.7
CO ₂ e Per Service Population	8.4	8.4
SCAQMD Proposed Service Population Threshold	6.6	4.9
Exceeds Threshold?	YES	YES

Notes: CO₂e = carbon dioxide equivalent; MT= metric tons.

As shown in Table 3.7-2, the proposed project would result in approximately 1.37 and 1.62 MMT of CO₂e per year in 2020 and 2030, respectively. Transportation sources are the largest source of emissions and represent approximately 56% to 60% of the total emissions. Energy consumption, including electricity and natural gas, is the next largest category at 19% to 20% of the total CO₂e emissions.

It is estimated that the proposed General Plan would accommodate 128,040 residents at full buildout. It is anticipated that the proposed General Plan will result in 65,234 jobs. Therefore, the total service population in 2030 would be 193,274. Assuming linear growth from 2011, this would result in a project-related population of 110,109 and 52,738 jobs in 2020.

As shown in Table 3.7-2, the total operational CO₂e emissions divided by service population associated with the proposed project in 2020 would result in 8.4 MT per service population per year, which would exceed the 6.6 MT threshold of significance. The efficiency calculations in 2030 would also result in

emissions of 8.4 MT per service population per year, which would exceed the 4.9 MT threshold of significance for that year, as estimated and discussed in Section 3.7.2.

Further reductions are also expected from other regulatory measures that will be developed under the mandate of AB 32, as identified and recommended in ARB's Scoping Plan. In general, the Scoping Plan focuses on achieving the state's GHG reduction goals with regulations that improve the efficiency of motor vehicles and the production (and consumption) of electricity. The rate of GHG emissions from development under the proposed project is projected to decrease in subsequent years as the regulatory environment progresses under AB 32. Additionally, new technology improvements may become available or the feasibility of existing technologies may improve. Nonetheless, a complete picture of the future regulatory environment is unknown at this time. GHG reduction measures promulgated under the AB 32 mandate may not be sufficient to cause future development to achieve ARB's recommended 28% reduction from business-as-usual emissions levels projected for 2020 (as discussed in the Scoping Plan) or the CO₂e per service population per year goal discussed above.

As mentioned earlier, the proposed General Plan includes a number of policies and programs to reduce operational GHG emissions. In addition to the policies discussed above, policies related to water conservation would reduce GHG emission by reducing needed energy resulting from transport, cleaning and pumping of water supplies. These policies examine a broad range of strategies to ensure the long-term sustainability of water supply, including strategies related to conservation, reclamation, recharge, and diversification of supply; coordinate development review of proposed project with the applicable water districts to ensure that adequate water supplies are available to support new development; and expansion of opportunities for the use of recycled water for a range of activities.

The policies included in the Conservation and Open Space element focus on energy conservation, upgrading the building code to the meet state's Net Zero Energy goals by the year 2020, reducing water usage through recycling and conservation, and encouraging recycling of solid waste. However, it is unclear the extent to which these policies will reduce GHG emissions in future years. Therefore, the proposed project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. The proposed project would result in a program-level impact and contribute to this **significant** impact; mitigation is required.

Conflict with an Applicable Plan, Policy, or Regulation Adopted to Reduce Greenhouse Gas Emissions

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed ARB to develop a Scoping Plan and identify a list of early action GHG reduction measures. ARB has developed several reports to achieve the legislative targets that rely on voluntary actions of California businesses, local government and community groups, and state incentive and regulatory programs. The adopted Scoping Plan includes proposed GHG reductions from direct regulations, alternative compliance mechanisms, monetary and nonmonetary incentives, voluntary actions, and market-based mechanisms such as cap-and-trade systems. The Scoping Plan did not directly create any regulatory requirements for the City or for projects anticipated under the proposed General Plan. However, regulatory changes would affect GHG

emission rates from vehicles uses by residents and business. Regulatory changes could affect GHG emissions rates associated with electricity demand created by proposed General Plan land uses. Project land uses will be required to comply with future regulatory changes, as appropriate.

ARB's Scoping Plan includes measures that would indirectly address GHG emissions levels associated with construction activity, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of a Low Carbon Fuel Standard. Policies formulated under the mandate of AB 32 that are applicable to construction-related activity, either directly or indirectly, are assumed to be implemented during construction of the proposed project if those policies and laws are developed before construction begins. Therefore, it is assumed that project construction would not conflict with the Scoping Plan.

The proposed General Plan would not conflict with the AB 32 Scoping Plan, or any other plans, policies, or regulations for the purpose of reducing GHG emissions. Neither the City nor any other agency with jurisdiction over this project has adopted climate change or GHG reduction measures with which the proposed General Plan would conflict. The impact is **less than significant**.

3.7.5 MITIGATION MEASURES

Generation of GHG Emissions

Construction

GHG-1 To reduce construction-generated GHG emissions, projects seeking discretionary approval from the City shall implement all feasible measures for reducing GHG emissions associated with construction that are recommended by the City and/or SDAPCD at the time individual portions of the site undergo construction.

The project applicant(s) for any particular discretionary project may submit a report to the City that substantiates why specific measures are considered infeasible for construction of that particular discretionary project and/or at that point in time. By requiring that the list of feasible measures be established prior to the selection of a primary contractor, this measure requires that the ability of a contractor to effectively implement the selected GHG reduction measures be inherent to the selection process.

The recommended measures for reducing construction-related GHG emissions at the time of writing this EIR are listed below. The list will be updated as new technologies or methods become available. The project applicant(s) shall, at a minimum, be required to implement the following:

- Improve fuel efficiency of construction equipment:
 - reduce unnecessary idling (modify work practices, install auxiliary power for driver comfort);

- perform equipment maintenance (inspections, detect failures early, corrections);
 - train equipment operators in proper use of equipment;
 - use the proper size of equipment for the job; and
 - use equipment with new technologies (repowered engines, electric drive trains).
- Use alternative fuels for electricity generators and welders at construction sites such as propane or solar, or use electrical power.
 - Use an ARB-approved low-carbon fuel, such as biodiesel or renewable diesel for construction equipment. Emissions of NO_x from the use of low carbon fuel must be reviewed and increases mitigated. Additional information about low-carbon fuels is available from ARB's Low Carbon Fuel Standard Program.
 - Reduce electricity use in the construction offices by using compact fluorescent bulbs, powering off computers every day, and replacing heating and cooling units with more efficient ones.
 - Recycle or salvage nonhazardous construction and demolition debris.
 - Use locally sourced or recycled materials for construction materials (goal of at least 20% based on costs for building materials, and based on volume for roadway, parking lot, sidewalk, and curb materials).
 - Develop a plan to efficiently use water for adequate dust control. This may consist of the use of nonpotable water from a local source.

GHG-2 As a part of a contractor demolition package, require 25% of non-hazardous debris (excluding excavated soil and land-clearing debris) to be recycled or salvaged. Work with contractors to share best practices on building recycling and reuse and demolition techniques to minimize waste, dust generation, water and energy use and other impacts of construction and demolition work. (Implementation Program COS-7.4)

GHG-3 Upgrade the California Green Code and the San Marcos Green Building Ordinance requirements in a regular and timely manner as mainline construction practices develop and new materials and building products become available with the goal of meeting the state's Net Zero Energy goals by the year 2020. (Implementation Program COS-4.5)

Operational

GHG-4 Partner with private industry (e.g., solar technology providers) to incorporated renewable energy features in commercial, business park, and industrial developments. (Implementation Program COS-4.8)

GHG-5 GHG emission reduction strategies and their respective feasibility are likely to evolve over time. The applicants for projects developed as part of the proposed General Plan shall consider and implement, as feasible, the following nonexclusive and nonexhaustive list of measures. These measures are derived from multiple sources, including Appendix B of the California Air Pollution Control Officer's Association (CAPCOA) white paper, CEQA & Climate Change (CAPCOA 2008); CAPCOA's Quantifying Greenhouse Gas Mitigation Measures. A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures (CAPCOA 2010); the California Attorney General's Office publication entitled The California Environmental Quality Act: Addressing Global Warming Impacts at the Local Agency Level (California Attorney General's Office 2008); and the BAAQMD's CEQA Guidelines (BAAQMD 2010).

Energy Efficiency

- Install clean alternative energy features to promote energy self-sufficiency (e.g., photovoltaic cells, solar thermal electricity systems, small wind turbines).
- Install solar water heaters.
- Encourage the use of smart meters and require programmable thermostats.
- Require HVAC duct sealing and periodic inspection.
- Site buildings to take advantage of shade and prevailing winds and design landscaping and sun screens to reduce energy use. Plant shade trees within 40 feet of the south sides or within 60 feet of the west sides of properties.
- Install efficient lighting in all buildings (including residential). Also install lighting control systems, where practical. Maximize daylight as an integral part of lighting systems in all buildings.
- Install cool roof materials (albedo ≥ 30).
- Install light-colored "cool" pavements, and strategically locate shade trees along all bicycle and pedestrian routes.

Water Conservation and Efficiency

- With the exception of ornamental shade trees, use water-efficient landscapes with native, drought-resistant species in all public areas and commercial landscaping. Use water-efficient turf in parks and other turf-dependent spaces.
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
- Design buildings and lots to be water-efficient. Only install water-efficient fixtures and appliances.
- Consider restricting watering methods (e.g., prohibit systems that apply water to nonvegetated surfaces) and control runoff. Prohibit businesses from using pressure

washers for cleaning driveways, parking lots, sidewalks, and street surfaces. These restrictions should be included in the Covenants, Conditions, and Restrictions of the community.

- Provide education about water conservation and available programs and incentives.

Solid Waste Measures

- Provide interior and exterior storage areas for recyclables, food waste, and green waste at all buildings; create food waste and greenwaste curbside pickup.
- Provide adequate recycling containers in public areas, including parks, school grounds, and pedestrian zones in areas of mixed-use development.

GHG-6 Continue to implement a full complement of City programs that encourage and accommodate recycling of a broad range of materials, including, but not limited to, the following:

- Curbside commingled recycling
- Curbside green waste recycling
- Waste motor oil collection
- Waste motor oil and commingled recycling drop off
- Sharp objects/needles medical recycling
- Electronic appliance recycling
- Commercial bin recycling
- Construction and demolition waste recycling
- Bulk-item materials collection
- Recycling at multiple-family housing complexes

(Implementation Program COS-7.2)

GHG-7 Educate the public regarding the various recycling programs that the City offers, and the benefits of recycling and waste reduction, including tips on how to recycle. (Implementation Program COS-7.3)

GHG-8 Coordinate development review of proposed project with the applicable water districts to ensure that adequate water supplies are available to support new development and redevelopment. (Implementation Program COS-5.1)

GHG-9 The City will work with applicable water districts and the San Diego County Water Authority to examine strategies to address the City's water supply needs in compliance with the Urban Water Management Plan. (Implementation Program COS-5.2)

GHG-10 Work with water purveyors to expand opportunities for the use of recycled water for activities such as outdoor irrigation, toilet flushing, fire hydrants, commercial and industrial processes, carwashes, concrete batching, laundromats, dust control, parks, golf courses, other

landscaped areas, and other appropriate water-intensive uses. (Implementation Program COS-5.3)

Conflict with an Applicable Plan, Policy, or Regulation Adopted to Reduce Greenhouse Gas Emissions

Impacts would be less than significant, no mitigation is required.

3.7.6 SIGNIFICANCE OF IMPACT AFTER MITIGATION

Generation of GHG Emissions

Construction

Mitigation Measures GHG-1, GHG-2 and GHG-3 are proposed to address impacts associated with GHG emissions generated by construction. Mitigation Measure GHG-1 requires discretionary projects to employ project-specific measures to be employed to reduce construction-generated GHG emissions. Mitigation Measure GHG-2 states contractor demolition packages will recycle or salvage a portion of non-hazardous debris. Mitigation Measure GHG-3 states the City will upgrade the San Marcos Green Building Ordinance on a regular basis to include new practices with the goal of meeting the state's New Zero Energy Goals by 2020.

Implementation of Mitigation Measure GHG-1, GHG-2, and GHG-3, in combination with the policies of the proposed General Plan, would reduce construction impacts to a **less than significant** level.

Operational

Mitigation Measures GHG-4, GHG-5, GHG-6, GHG-7, GHG-8, GHG-9 and GHG-10 are proposed to address impacts associated with operational GHG emissions. Mitigation Measure GHG-4 requires public-private partnerships to incorporate renewable energy features into non-residential developments. Mitigation Measure GHG-5 provides a list, and requires implementation of listed measures to reduce GHG emissions on a project-specific level. Mitigation Measure GHG-6 continues City recycling programs for a range of materials. Mitigation Measure GHG-7 states the City will educate the public on City recycling programs. Mitigation Measure GHG-8 coordinates development review with water supply to ensure adequate resources are available and provided. Mitigation Measure GHG-9 states the City will work with applicable water districts and the San Diego County Water Authority to meet water needs and comply with the Urban Water Management Plan. Mitigation Measure GHG-10 states the City will work with water purveyors to expand opportunities for use of recycled water.

Implementation of Mitigation Measures GHG-4, GHG-5, GHG-6, GHG-7, GHG-8, GHG-9 and GHG-10 would reduce operational emissions, but it is unclear to what extent these measures would be applied throughout the project area. Therefore, it cannot be ensured that these reductions would reduce emissions below the 6.6 MT threshold per service population per year in 2020 or the 4.9 MT threshold per service

population per year in 2030. Mitigation Measures would result in impact reductions, however not below significant levels. This impact would remain **significant and unavoidable**.

Conflict with an Applicable Plan, Policy, or Regulation Adopted to Reduce Greenhouse Gas Emissions

Neither the City nor any other agency with jurisdiction over this project has adopted climate change or GHG reduction measures with which the proposed General Plan would conflict. The impact is **less than significant**. No mitigation is required.