

5.7 GREENHOUSE GAS EMISSIONS

This section provides a discussion of the Project's effect on greenhouse gas emissions and the associated effects of climate change. The reader is referred to Section 5.3, Air Quality, for a discussion of Project impacts associated with air quality.

5.7.1 EXISTING SETTING

EXISTING CLIMATE SETTING

Since the early 1990s, scientific consensus holds that the world's population is releasing greenhouse gases (GHGs) faster than the earth's natural systems can absorb them. These gases are released as byproducts of fossil fuel combustion, waste disposal, energy use, land use changes, and other human activities. This release of gases, such as carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), creates a blanket around the earth that allows light to pass through but traps heat at the surface, preventing its escape into space. While this is a naturally occurring process known as the greenhouse effect, human activities have accelerated the generation of greenhouse gases beyond natural levels. The overabundance of greenhouse gases in the atmosphere has led to a warming of the earth and has the potential to severely affect the earth's climate system.

While often used interchangeably, there is a difference between the terms *climate change* and *global warming*. According to the National Academy of Sciences, climate change refers to any significant, measurable change of climate lasting for an extended period of time that can be caused by both natural factors and human activities. Global warming, on the other hand, is an average increase in the temperature of the atmosphere caused by increased greenhouse gas emissions. The use of the term *climate change* is becoming more prevalent because it encompasses all changes to the climate, not just temperature.

To fully understand global climate change, it is important to recognize the naturally occurring greenhouse effect and to define the greenhouse gases that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are CO₂, CH₄, N₂O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

Table 5.7-1 provides descriptions of the primary greenhouse gases attributed to global climate change, including a description of their physical properties, primary sources, and contribution to the greenhouse effect.

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**TABLE 5.7-1
GREENHOUSE GASES**

Greenhouse Gas	Description
Carbon Dioxide (CO ₂)	Carbon dioxide is a colorless, odorless gas. CO ₂ is emitted in a number of ways, both naturally and through human activities. The largest source of CO ₂ emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO ₂ emissions. The atmospheric lifetime of CO ₂ is variable because it is so readily exchanged in the atmosphere. ¹
Methane (CH ₄)	Methane is a colorless, odorless gas that is not flammable under most circumstances. CH ₄ is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (intestinal fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane's atmospheric lifetime is about 12 years. ²
Nitrous Oxide (N ₂ O)	Nitrous oxide is a clear, colorless gas with a slightly sweet odor. N ₂ O is produced by both natural and human-related sources. Primary human-related sources of N ₂ O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N ₂ O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N ₂ O is approximately 120 years. ³
Hydrofluorocarbons (HFCs)	Hydrofluorocarbons are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 260 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years). ⁴
Perfluorocarbons (PFCs)	Perfluorocarbons are colorless, highly dense, chemically inert, and nontoxic. There are seven PFC gases: perfluoromethane (CF ₄), perfluoroethane (C ₂ F ₆), perfluoropropane (C ₃ F ₈), perfluorobutane (C ₄ F ₁₀), perfluorocyclobutane (C ₄ F ₈), perfluoropentane (C ₅ F ₁₂), and perfluorohexane (C ₆ F ₁₄). Natural geological emissions have been responsible for the PFCs that have accumulated in the atmosphere in the past; however, the largest current source is aluminum production, which releases CF ₄ and C ₂ F ₆ as byproducts. The estimated atmospheric lifetimes for CF ₄ and C ₂ F ₆ are 50,000 and 10,000 years, respectively. ^{4,5}
Sulfur Hexafluoride (SF ₆)	Sulfur hexafluoride is an inorganic compound that is colorless, odorless, nontoxic, and generally nonflammable. SF ₆ is primarily used as an electrical insulator in high voltage equipment. The electric power industry uses roughly 80 percent of all SF ₆ produced worldwide. Significant leaks occur from aging equipment and during equipment maintenance and servicing. SF ₆ has an atmospheric life of 3,200 years. ⁴

Sources: ¹EPA 2011a, ²EPA 2011b, ³EPA 2010a, ⁴EPA 2010b, ⁵EFCTC 2003

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Gases with high global warming potential, such as HFCs, PFCs, and SF₆, are the most heat-absorbent. Methane traps over 21 times more heat per molecule than CO₂, and N₂O absorbs 310 times more heat per molecule than CO₂.

Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO₂e), which weighs each gas by its global warming potential (GWP). Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO₂ were being emitted. **Table 5.7-2** shows the GWPs for different greenhouse gases for a 100-year time horizon.

**TABLE 5.7-2
GLOBAL WARMING POTENTIAL FOR GREENHOUSE GASES**

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous Oxide (N ₂ O)	310
Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs)	6,500
Sulfur Hexafluoride (SF ₆)	23,900

Source: California Climate Action Registry 2009a

As the name implies, global climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, respectively. California is a significant emitter of CO₂ in the world and produced 448 million gross metric tons of CO₂e in 2011 (CARB 2013). Consumption of fossil fuels in the transportation sector was the single largest source of California’s GHG emissions in 2011, accounting for 37.5 percent of total GHG emissions in the state (CARB 2013). This category was followed by the industrial sector (20.7 percent) and electric power sector (including both in-state and out-of-state sources) (19.3 percent) (CARB 2013).

EFFECTS OF GLOBAL CLIMATE CHANGE

California can draw on substantial scientific research conducted by experts at various state universities and research institutions. With more than a decade of concerted research, scientists have established that the early signs of climate change are already evident in the state—as shown, for example, in increased average temperatures, changes in temperature extremes, reduced snowpack in the Sierra Nevada, sea level rise, and ecological shifts.

Many of these changes are accelerating—locally, across the country, and around the globe. As a result of emissions already released into the atmosphere, California will face intensifying climate changes in coming decades (CNRA 2009a). Generally, research indicates that California should expect overall hotter and drier conditions with a continued reduction in winter snow (with concurrent increases in winter rains), as well as increased average temperatures and accelerating sea-level rise. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing (CNRA 2009a).

Climate change temperature projections identified in the 2009 California Climate Adaptation Strategy suggest the following:

- Average temperature increase is expected to be more pronounced in the summer than in the winter season.
- Inland areas are likely to experience more pronounced warming than coastal regions.

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- Heat waves are expected to increase in frequency, with individual heat waves also showing a tendency toward becoming longer and extending over a larger area, thus more likely to encompass multiple population centers in California at the same time.
- As GHGs remain in the atmosphere for decades, temperature changes over the next 30 to 40 years are already largely determined by past emissions. By 2050, temperatures are projected to increase by an additional 1.8 to 5.4°F (an increase one to three times as large as that which occurred over the entire twentieth century).
- By 2100, the models project temperature increases between 3.6 and 9°F. (CNRA 2009a)

According to the 2009 California Climate Adaptation Strategy, the impacts of climate change in California have the potential to include, but are not limited to, the areas discussed in **Table 5.7-3**.

**TABLE 5.7-3
POTENTIAL STATEWIDE IMPACTS FROM CLIMATE CHANGE**

Potential Statewide Impact	Description
Public Health	Climate change is expected to lead to an increase in ambient (i.e., outdoor) average air temperature, with greater increases expected in summer than in winter months. Larger temperature increases are anticipated in inland communities as compared to the California coast. The potential health impacts from sustained and significantly higher than average temperatures include heat stroke, heat exhaustion, and the exacerbation of existing medical conditions such as cardiovascular and respiratory diseases, diabetes, nervous system disorders, emphysema, and epilepsy. Numerous studies have indicated that there are generally more deaths during periods of sustained higher temperatures, and these are due to cardiovascular causes and other chronic diseases. The elderly, infants, and socially isolated people with pre-existing illnesses who lack access to air conditioning or cooling spaces are among the most at risk during heat waves.
Floods and Droughts	<p>The impacts of flooding can be significant. Results may include population displacement, severe psychosocial stress with resulting mental health impacts, exacerbation of pre-existing chronic conditions, and infectious disease. Additionally, impacts can range from a loss of personal belongings, and the emotional ramifications from such loss, to direct injury and/or mortality.</p> <p>Drinking water contamination outbreaks in the United States are associated with extreme precipitation events. Runoff from rainfall is also associated with coastal contamination that can lead to contamination of shellfish and contribute to food-borne illness. Floodwaters may contain household, industrial, and agricultural chemicals as well as sewage and animal waste. Flooding and heavy rainfall events can wash pathogens and chemicals from contaminated soils, farms, and streets into drinking water supplies. Flooding may also overload storm and wastewater systems, or flood septic systems, also leading to possible contamination of drinking water systems.</p> <p>Drought impacts develop more slowly over time. Risks to public health that Californians may face from drought include impacts on water supply and quality, food production (both agricultural and commercial fisheries), and risks of waterborne illness. As surface water supplies are reduced as a result of drought conditions, the amount of groundwater pumping is expected to increase to make up for the water shortfall. The increase in groundwater pumping has the potential to lower the water tables and cause land subsidence. Communities that utilize well water will be adversely affected by drops in water tables or through changes in water quality. Groundwater supplies have higher levels of total dissolved solids compared to surface waters. This introduces a set of effects for consumers, such as repair and maintenance costs associated with mineral deposits in water heaters and other plumbing fixtures, and on public water system infrastructure designed for lower salinity surface water supplies. Drought may also lead to increased concentration</p>

Potential Statewide Impact	Description
	of contaminants in drinking water supplies.
Water Resources	The state’s water supply system already faces challenges to provide water for California’s growing population. Climate change is expected to exacerbate these challenges through increased temperatures and possible changes in precipitation patterns. The trends of the last century—especially increases in hydrologic variability—will likely intensify in this century. The state can expect to experience more frequent and larger floods and deeper droughts. Rising sea level will threaten the Delta water conveyance system and increase salinity in near-coastal groundwater supplies. Planning for and adapting to these simultaneous changes, particularly their impacts on public safety and long-term water supply reliability, will be among the most significant challenges facing water and flood managers this century.
Forests and Landscapes	Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, wildfire occurrence statewide could increase from 57 percent to 169 percent by 2085. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state.

Source: CNRA 2009a

Current Greenhouse Gas Emissions

Statewide Inventory

The California GHG inventory compiles statewide anthropogenic GHG emissions and sinks. It includes estimates for CO₂, CH₄, N₂O, SF₆, nitrogen trifluoride (NF₃), HFCs, and PFCs. The current inventory covers years 2000 to 2008.

Annual statewide emission inventories provide the basis for establishing historical emission trends. Trends are useful in tracking progress toward a specific goal or target. There are many factors affecting GHG emissions, including the state of the economy, changes in demography, improved efficiency, and changes in environmental conditions such as drought. 2008 saw a small decrease in statewide GHG emissions, driven by a noticeable drop in on-road transportation emissions. 2008 also reflects the beginning of the economic recession and fuel price spikes. California generated approximately 449,590,000 metric tons of GHG emissions in 2009 and 448,110,000 metric tons in 2011 (CARB 2013).

Citywide Inventory

In June 2009, Sacramento County finalized a greenhouse gas inventory for each jurisdiction in the county. The inventory calculates municipal and community-wide emissions caused by activities in 2005, including transportation, waste, water, and energy-related activities. The inventory established a baseline against which future changes in emissions can be measured and provides an understanding of major sources of GHG emissions in the City and the region.

The City of Elk Grove has since revised this citywide inventory to incorporate new data and GHG accounting methods and protocols, identifying a revised total of 737,838 metric tons of CO₂e in 2005. Revisions to the inventory include, but are not limited to, revised vehicle miles traveled (VMT) calculations, omission of off-road equipment and vehicle emissions, omission of residential wood-burning emissions, omission of wastewater treatment and discharge emissions, and omission of high global warming potential emissions (such as fugitive refrigerant emissions) (City of Elk Grove 2013a).

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5.7.2 REGULATORY FRAMEWORK

The adoption of recent legislation has provided a clear mandate that climate change must be included in an environmental review for a project subject to the California Environmental Quality Act (CEQA). Several GHG emission-related laws and regulations are provided below.

FEDERAL REGULATION AND THE CLEAN AIR ACT

In the past, the US Environmental Protection Agency (EPA) has not regulated greenhouse gases under the Clean Air Act (CAA) because it asserted that the act did not authorize the EPA to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. However, the US Supreme Court held that the EPA must consider regulation of motor vehicle GHG emissions. In *Massachusetts v. Environmental Protection Agency et al.*, twelve states and cities, including California, together with several environmental organizations, sued to require the EPA to regulate GHGs as pollutants under the Clean Air Act (127 S. Ct. 1438 [2007]). The US Supreme Court held that the EPA was authorized by the Clean Air Act to regulate CO₂ emissions from new motor vehicles. The court did not mandate that the EPA enact regulations to reduce GHG emissions, but found that the only instances in which the EPA could avoid taking action were if it found that GHG emissions do not contribute to climate change or if it offered a “reasonable explanation” for not determining that GHG emissions contribute to climate change.

On December 7, 2009, the EPA issued an “endangerment finding” under the Clean Air Act, concluding that GHG emissions threaten the public health and welfare of current and future generations and that motor vehicles contribute to GHG pollution (EPA 2009). These findings provide the basis for adopting new national regulations to mandate GHG emissions reductions under the federal Clean Air Act. The EPA’s endangerment finding paves the way for federal regulation of GHG emissions.

It was expected that Congress would enact GHG legislation, primarily for a cap-and-trade system. However, proposals circulated in both the House of Representative and the Senate were controversial, and it may be some time before Congress adopts major climate change legislation. Under the Consolidated Appropriations Act of 2008 (HR 2764), Congress has established mandatory GHG reporting requirements for some emitters of greenhouse gases. In addition, on September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. The rule requires annual reporting to the EPA of GHG emissions from large sources and suppliers of greenhouse gases, including facilities that emit 25,000 metric tons or more a year of GHGs.

The following discussion summarizes the EPA’s recent regulatory activities with respect to various types of GHG sources.

EPA and National Highway Traffic Safety Administration Joint Rulemaking for Vehicle Standards

In response to the *Massachusetts v. EPA* ruling discussed above, the Bush Administration issued an Executive Order on May 14, 2007, directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008.

On October 10, 2008, the National Highway Traffic Safety Administration (NHTSA) released a final environmental impact statement analyzing proposed interim standards for passenger cars and light trucks in model years 2011 through 2015. The NHTSA (2009) issued a final rule for model year 2011 on March 30, 2009.

On May 7, 2010, the EPA and the NHTSA issued a final rule regulating fuel efficiency and GHG pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016 (EPA 2010c). On May 21, 2010, President Obama issued a memorandum to the Secretaries of Transportation and Energy, and to the Administrators of the EPA and the NHTSA, calling for the establishment of additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and the NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal greenhouse gas and fuel economy standards for model year 2017–2025 light-duty vehicles. The agencies proposed standards projected to achieve 163 grams per mile of CO₂ in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. California has announced its support of this national program. The final rule was adopted in October 2012, and the NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

Fuel Efficiency Standards for Heavy-Duty Engines and Vehicles

In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the EPA and the NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks, which apply to vehicles from model years 2014–2018. Both the EPA and the NHTSA have adopted standards for CO₂ emissions and fuel consumption, respectively, tailored to each of three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this program will reduce GHG emissions and fuel consumption for affected vehicles by 6 percent to 23 percent.

EPA SmartWay Program

SmartWay is an EPA program that reduces transportation-related emissions by creating incentives to improve supply chain fuel efficiency. The program has five primary components: (1) SmartWay Transport Partnership, a partnership in which freight carriers and shippers commit to benchmark operations, track fuel consumption and improve performance annually; (2) SmartWay Technology Program, a testing, verification, and designation program to help freight companies identify equipment, technologies, and strategies that save fuel and lower emissions; (3) SmartWay Finance Program, a competitive grant program that makes investing in fuel-saving equipment easier for freight carriers; (4) SmartWay Vehicles, a program that ranks light-duty cars and small trucks and identifies superior environmental performers with the SmartWay logo; and (5) SmartWay International Interests, which provides guidance and resources for countries seeking to develop freight sustainability programs modeled after SmartWay.

STATE REGULATION

California has adopted various administrative initiatives and also enacted a variety of legislation relating to climate change, much of which sets aggressive goals for GHG emissions reductions within the state. However, none of this legislation provides definitive direction regarding the treatment of climate change in the environmental review documents prepared under CEQA. In particular, the amendments to the CEQA Guidelines do not require or suggest specific methodologies for performing an assessment or thresholds of significance and do not specify

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greenhouse gas reduction mitigation measures. Instead, the CEQA amendments continue to rely on lead agencies to choose methodologies and make significance determinations based on substantial evidence, as discussed in further detail below. In addition, no state agency has promulgated binding regulations for analyzing GHG emissions, determining their significance, or mitigating any significant effects in CEQA documents. Thus, lead agencies exercise their discretion determining how to analyze greenhouse gases.

The discussion below provides a brief overview of California Air Resources Board (CARB) and Office of Planning and Research (OPR) documents and of the primary legislation relating to climate change that may affect the emissions associated with the proposed Project. It begins with an overview of the primary regulatory acts that have driven GHG regulation and analysis in California.

Executive Order S-3-05 (Statewide GHG Targets)

California Executive Order S-03-05 (June 1, 2005) mandates a reduction of GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. Although the 2020 target has been incorporated into legislation (AB 32), the 2050 target remains only a goal of the Executive Order.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

The California Global Warming Solutions Act of 2006 (AB 32) (Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) was signed into law in September 2006 after considerable study and expert testimony before the legislature. The law instructs CARB to develop and enforce regulations for the reporting and verifying of statewide GHG emissions. The act directed CARB to set a GHG emissions limit based on 1990 levels, to be achieved by 2020. The bill set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

The heart of the bill is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020 (1990 levels have been estimated to equate to 15 percent below 2005 emission levels). Based on CARB's calculation of 1990 baseline emissions levels, California must reduce GHG emissions by approximately 29 percent below "business-as-usual" predictions of year 2020 GHG emissions to achieve this goal.

The bill required CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. CARB accomplished the key milestones set forth in AB 32, including the following:

- June 30, 2007. Identification of discrete early action GHG emissions reduction measures. On June 21, 2007, CARB satisfied this requirement by approving three early action measures. These were later supplemented by adding six other discrete early action measures.
- January 1, 2008. Identification of the 1990 baseline GHG emissions level, approval of a statewide limit equivalent to that level, and adoption of reporting and verification requirements concerning GHG emissions. On December 6, 2007, CARB approved a statewide limit on GHG emissions levels for the year 2020 consistent with the determined 1990 baseline.

- January 1, 2009. Adoption of a scoping plan for achieving GHG emission reductions. On December 11, 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (Scoping Plan), discussed in more detail below.
- January 1, 2010. Adoption and enforcement of regulations to implement the “discrete” actions. Several early action measures have been adopted and became effective on January 1, 2010.
- January 1, 2011. Adoption of GHG emissions limits and reduction measures by regulation. On October 28, 2010, CARB released its proposed cap-and-trade regulations, which would cover sources of approximately 85 percent of California’s GHG emissions (CARB 2010a). CARB’s board ordered CARB’s executive director to prepare a final regulatory package for cap and trade on December 16, 2010.
- January 1, 2012. GHG emissions limits and reduction measures adopted in 2011 become enforceable.

AB 32 Scoping Plan

As noted above, on December 11, 2008, CARB adopted the Scoping Plan to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California’s GHG emissions. CARB determined that achieving the 1990 emissions level would require a reduction of GHG emissions of approximately 29 percent below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as “business as usual”). The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction measures by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
- Achieving a statewide renewables energy mix 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 and caps sources contributing 85 percent of California’s GHG emissions.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to existing state laws and policies, including California’s clean car standards, heavy-duty truck measures, and the Low Carbon Fuel Standard.
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State of California’s long-term commitment to AB 32 implementation. (CARB 2008a)

In 2009, a coalition of special interest groups brought a challenge to the Scoping Plan alleging that it violated AB 32 and that the environmental review document (called a “Functional Equivalent Document”) violated CEQA by failing to appropriately analyze alternatives to the

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proposed cap-and-trade program. On May 20, 2011, the San Francisco Superior Court entered a final judgment ordering that CARB take no further action with respect to cap-and-trade rulemaking until it complies with CEQA. While CARB disagrees with the trial court finding and appealed the decision on May 23, 2011, in order to remove any doubt about the matter and in keeping with CARB's interest in public participation and informed decision-making, CARB revisited the alternatives. The revised analysis includes the five alternatives included in the original environmental analysis: a "no project" alternative (that is, taking no action at all); a plan relying on a cap-and-trade program for the sectors included in a cap; a plan relying more on source-specific regulatory requirements with no cap-and-trade component; a plan relying on a carbon fee or tax; and a plan relying on a variety of proposed strategies and measures. The public hearing to consider approval of the AB 32 Scoping Plan Functional Equivalent Document and the AB 32 Scoping Plan was held on August 24, 2011. On this date, CARB re-approved the Scoping Plan.

In August 2012, CARB released revised estimates of the expected 2020 emissions reductions. The revised analysis relies on emissions projections updated in light of current economic forecasts which account for the economic downturn since 2008 as well as reduction measures already approved and put in place. This reduced the projected 2020 emissions from 596 million metric tons (MMT) CO₂e to 545 MMTCO₂e. The reduction in projected 2020 emissions means that the revised business-as-usual (BAU) reduction necessary to achieve AB 32's goal of reaching 1990 levels by 2020 is now only 21 percent.

Assembly Bill 1493

Assembly Bill 1493 ("the Pavley Standard," or AB 1493) (Health and Safety Code Sections 42823 and 43018.5) required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from noncommercial passenger vehicles and light-duty trucks of model years 2009–2016. The bill also required the California Climate Action Registry to develop and adopt protocols for the reporting and certification of GHG emissions reductions from mobile sources for use by CARB in granting emissions reduction credits. The bill authorizes CARB to grant emissions reduction credits for reductions in GHG emissions prior to the date of enforcement of regulations, using model year 2000 as the baseline for reduction.

In 2004, CARB applied to the EPA for a waiver under the federal Clean Air Act to authorize implementation of these regulations. The waiver request was formally denied by the EPA in December 2007 after California filed suit to prompt federal action. In January 2008, the California Attorney General filed a new lawsuit against the EPA for denying California's request for a waiver to regulate and limit GHG emissions from these vehicles. In January 2009, President Barack Obama issued a directive to the EPA to reconsider California's request for a waiver. On June 30, 2009, the EPA granted the waiver to California for its GHG emission standards for motor vehicles. As part of this waiver, the EPA specified the provision that CARB may not hold a manufacturer liable or responsible for any noncompliance caused by emission debits generated by a manufacturer for the 2009 model year. CARB has adopted a new approach to passenger vehicles—cars and light trucks—by combining the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards. The new approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California. These standards will apply to all passenger and light-duty trucks used by the residents of Elk Grove.

Low Carbon Fuel Standard

Executive Order S-01-07 (January 18, 2007) requires a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB. CARB identified the Low Carbon Fuel Standard (LCFS) as a discrete early action item under AB 32, and the final resolution (09-31) was issued on April 23, 2009. In 2009, CARB approved for adoption of the LCFS regulation, which became fully effective in April 2010 and is codified at Title 17, California Code of Regulations, Sections 95480–95490. The LCFS will reduce greenhouse gas emissions by reducing the carbon intensity of transportation fuels used in California by at least 10 percent by 2020. Carbon intensity is a measure of the GHG emissions associated with the various production, distribution, and use steps in the “life cycle” of a transportation fuel.

On December 29, 2011, the US District Court for the Eastern District of California issued several rulings in the federal lawsuits challenging the LCFS. One of the district court’s rulings preliminarily enjoined CARB from enforcing the regulation. In January 2012, CARB appealed that decision to the Ninth Circuit Court of Appeals and then moved to stay the injunction pending resolution of the appeal. On April 23, 2012, the Ninth Circuit granted CARB’s motion for a stay of the injunction while it continues to consider CARB’s appeal of the lower court’s decision.

Clean Cars

In January 2012, CARB approved the Advanced Clean Cars Program, a new emissions-control program for model years 2017–2025. The program combines the control of smog, soot, and GHG emissions with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, the new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

Renewables Portfolio Standard (Senate Bill 1078, Senate Bill 107, and Senate Bill X1-2)

Established in 2002 under Senate Bill (SB) 1078, and accelerated in 2006 under SB 107 and again in 2011 under SBX1-2, California’s Renewables Portfolio Standard (RPS) requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020. The 33 percent standard is consistent with the RPS goal established in the Scoping Plan. As interim measures, the RPS requires 20 percent of retail sales to be sourced from renewable energy by 2013, and 25 percent by 2016. Initially, the RPS provisions applied to investor-owned utilities, community choice aggregators, and electric service providers. SBX1-2 added, for the first time, publicly owned utilities to the entities subject to the RPS. The expected growth in the RPS to meet the standards in effect in 2008 is not reflected in the BAU calculation in the AB 32 Scoping Plan. In other words, the Scoping Plan’s 2020 business as usual does not take credit for implementation of the RPS that occurred after its adoption.

Senate Bill 375

SB 375 (codified at Government Code and Public Resources Code¹), signed in September 2008, provides for a new planning process to coordinate land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 will be implemented over the next several years and includes provisions for streamlined CEQA review for some infill projects such as transit-oriented

¹ Senate Bill 375 is codified at Government Code Sections 65080, 65400, 65583, 65584.01, 65584.02, 65584.04, 65587, 65588, 14522.1, 14522.2, and 65080.01 as well as Public Resources Code Sections 21061.3 and 21159.28 and Chapter 4.2.

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development. SB 375 also requires metropolitan planning organizations (MPOs) to incorporate a “sustainable communities strategy” in their regional transportation plans that will achieve GHG emissions reduction targets by reducing vehicle miles traveled from light-duty vehicles through the development of more compact, complete, and efficient communities. The MPO with jurisdiction in the Project area is the Sacramento Area Council of Governments (SACOG).

SB 375 is similar to the Regional Blueprint Planning Program, established by the California Department of Transportation (Caltrans), which provides discretionary grants to fund regional transportation and land use plans voluntarily developed by MPOs working in cooperation with councils of governments. The Scoping Plan relies on the requirements of SB 375 to implement the carbon emissions reductions anticipated from land use decisions.

On September 23, 2010, CARB adopted regional targets for the reduction of greenhouse gases applying to the years 2020 and 2035 (CARB 2011a). For the area under SACOG jurisdiction, including the Project area, CARB adopted regional targets for reduction of GHG emissions by 7 percent for 2020 and by 16 percent for 2035 (CARB 2010b). On February 15, 2011, CARB’s executive officer approved the final targets (CARB 2011b).

California Building Energy Efficiency Standards

Energy conservation standards for new residential and commercial buildings were originally adopted by the California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the California Code of Regulations [CCR]). In general, Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

On July 17, 2008, the California Building Standards Commission adopted the nation’s first green building standards. The California Green Building Standards Code (Part 11, Title 24) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). Part 11 establishes voluntary standards on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. Some of these standards have become mandatory in the 2010 edition of the Part 11 code. Current mandatory standards include:

- Twenty (20) percent mandatory reduction in indoor water use, with voluntary goal standards for 30, 35, and 40 percent reductions
- Separate water meters for nonresidential buildings’ indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects
- Diversion of 50 percent of construction waste from landfills, increasing voluntarily to 65 and 75 percent for new homes and 80 percent for commercial projects
- Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies
- Low-pollutant-emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard

The California Energy Commission has opened a public process and rulemaking proceeding for the adoption of changes to the 2013 Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (also known as the California Energy Code) and associated administrative regulations in Part 1 (collectively referred to here as the standards). The proposed amended standards will be adopted in 2014. The 2013 Building Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The standards, which take effect on January 1, 2014, will offer builders better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses.

LOCAL

Sacramento Metropolitan Air Quality Management District

The proposed Project is located in the Sacramento Valley Air Basin, which is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). The SMAQMD (2011) offers the guidance contained in the Guide to Air Quality Assessment in Sacramento County for addressing the GHG emissions associated with land use development projects. However, the SMAQMD does not currently have an adopted threshold of significance for GHG emissions. The SMAQMD recommends addressing the potential impacts of project-generated GHG emissions, including a description of the existing environmental conditions or setting (see Existing Setting above), a discussion of the existing regulatory environment pertaining to GHGs (see Regulatory Framework above), a discussion of the GHG emission sources associated with the proposed Project's construction and operational activities, and a discussion of feasible construction and operational mitigation necessary to reduce impacts.

City of Elk Grove Climate Action Plan and Sustainability Element

Background

On March 27, 2013, the City of Elk Grove adopted a Climate Action Plan (CAP) and the Sustainability Element of the General Plan. The Sustainability Element and CAP are two separate but related components of the City's sustainability strategy. The City is taking proactive steps to become a more environmentally sustainable community and respond to State requirements related to GHG emissions. The CAP is a culmination of existing and proposed initiatives to reduce GHG emissions through goals and measures related to transportation, land use, energy use, waste, and water use. The CAP is a tool for the City to achieve the State-recommended GHG emissions reduction target in Elk Grove through new and existing land uses, transportation, and City codes and programs. Concurrently with the CAP, the City adopted a new General Plan Sustainability Element. The Sustainability Element is a long-term (20+ years) plan that organizes and highlights the City's goals related to sustainability and provides new direction and vision to maintain a healthy, balanced community. As an element of the City's General Plan, the Sustainability Element governs land use decisions. The Sustainability Element also creates an overarching framework for the City to achieve GHG emissions reductions.

The CAP functions as an implementation tool of the Sustainability Element, focusing specifically on strategies to reduce GHG emissions and providing direction to reduce emissions consistent with State recommendations. It also builds on the goals and vision of the Sustainability Element, but translates these goals into numeric estimates of GHG emissions reduction potential. While the CAP is not an adopted component of the General Plan, it is connected to the General Plan as an implementation item of the Sustainability Element in order to directly implement the goals and policies of the element.

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CEQA Streamlining and the CAP

Responding to the State CEQA Guidelines identified above, lead agencies may use adopted GHG emissions reduction plans to assess the cumulative impacts of discretionary projects on climate change. The guidelines also provide a mechanism to streamline development review of future projects. The City of Elk Grove CAP meets the criteria identified in CEQA Guidelines for a GHG reduction plan.

For developments wishing to benefit from CEQA streamlining provisions provided by the CAP, a project must demonstrate consistency with the CAP forecasts, include measures applicable to the project, and demonstrate the project's incorporation of the measures. The City determined the GHG impacts of community-wide GHG emissions based on the AB 32 reduction target. The City identified the statewide AB 32 reduction target as the reduction of GHG emissions to 1990 levels by 2020, or as outlined in the AB 32 Scoping Plan, the functional equivalent of 15 percent below "existing" (2005–2008) levels by 2020. For the purpose of defining existing emissions levels, the City chose the emissions in the year 2005 as a benchmark for existing emissions conditions in the City (City of Elk Grove 2013a). The Sustainability Element adopts the target of a 15 percent reduction below 2005 emissions by 2020, whereas the CAP provides the mitigations to achieve the reduction target.

The City's target is consistent with statewide efforts established in CARB's Climate Change Scoping Plan to reduce statewide GHG emissions to 1990 levels by 2020. The CAP presents a 2020 target of 627,128 metric tons CO₂e. As shown in **Table 5.7-4**, the CAP achieves a community-wide 15 percent reduction below baseline 2005 levels by 2020.

**TABLE 5.7-4
CLIMATE ACTION PLAN COMMUNITY-WIDE GHG REDUCTIONS—METRIC TONS PER YEAR***

Emissions Inventory	
2005 Baseline Emissions Inventory	737,838
2020 Unmitigated Emissions Inventory	1,017,499
Reductions from 2020 Unmitigated Emissions Inventory	
California State-Led Reductions	
SMUD Renewables Portfolio Standard	-102,452
CALGreen Building Standards (Buildings Energy Efficiency Standards)	-17,305
Clean Car Fuel Standard (AB 1493 Pavley Vehicle Standards)	-65,140
Low Carbon Fuel Standard	-29,642
Total State-Led Emissions Reductions	-214,539
Elk Grove Climate Action Plan Reductions	
An Innovative and Efficient Built Environment	-37,240
Resource Conservation	-28,221
Transportation Alternatives and Congestion Management	-108,221
Municipal Programs	-2,149
Total Climate Action Plan Emissions Reductions	-175,831
Combined CAP and State Reductions	390,371
AB 32 Emissions Target (15% below 2005 Baseline Inventory)	627,162
Elk Grove Climate Action Plan and State-Adjusted Inventory	627,128
AB 32 Target Achieved?	Yes

*Note: Due to rounding, the total may not be the sum of component parts.

Source: City of Elk Grove 2013a

In March 2013, the City certified a Subsequent Environmental Impact Report (SEIR) for the Sustainability Element and CAP (City of Elk Grove 2013b). The City prepared the SEIR for use as a tiering and streamlining document for GHG emissions as allowed under Section 15183.5 of the CEQA Guidelines. The SEIR allows the City to use the CAP to determine that a subsequent project's incremental contribution to GHG and climate change impacts is not cumulatively considerable if the Project complies with the CAP.

5.7.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the following CEQA Guidelines Appendix G Environmental Checklist. A greenhouse gas impact is considered significant if implementation of the Project will:

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

GHG emissions associated with the Project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with Project-related new vehicular trips, stationary source emissions such as natural gas used for heating, and indirect source emissions such as electricity usage for lighting. Preliminary guidance from the Office of Planning and Research (OPR) and letters from the Attorney General critical of CEQA documents that have taken different approaches indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, and construction activities. The calculation presented below includes construction and long-term operational emissions in terms of annual CO₂e.

Addressing GHG generation impacts requires an agency to make a determination as to what constitutes a significant impact. The amendments to the CEQA Guidelines specifically allow lead agencies to determine thresholds of significance that illustrate the extent of an impact and are a basis from which to apply mitigation measures. This means that each agency is left to determine if a project's GHG emissions will have a "significant" impact on the environment. The guidelines direct that agencies are to use "careful judgment" and "make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" the project's GHG emissions (14 CCR Section 15064.4[a]).

In its Final Statement of Reasons for Regulatory Action accompanying the CEQA Amendments (FSOR), the California Natural Resources Agency (CNRA) (2009b) explains that quantification of GHG emissions "is reasonably necessary to ensure an adequate analysis of GHG emissions using available data and tools" and that "quantification will, in many cases, assist in the determination of significance." However, as explained in the FSOR, the revised Section 15064.4(b) assigns lead agencies the discretion to determine the methodology to quantify GHG emissions. The FSOR also notes that CEQA case law has long stated that "there is no iron-clad definition of 'significance.'" Accordingly, lead agencies must use their best efforts to investigate and disclose all that they reasonably can concerning a project's potential adverse impacts."

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Determining a threshold of significance for a project's climate change impacts poses a special difficulty for lead agencies. Much of the science in this area is new and is evolving constantly. At the same time, neither the state nor local agencies is specialized in this area, and there are currently no local, regional, or state thresholds for determining whether a project has a significant impact on climate change. The CEQA Amendments do not prescribe specific significance thresholds but instead leave considerable discretion to lead agencies to develop appropriate thresholds to apply to projects within their jurisdiction.

As noted earlier, AB 32 is a legal mandate requiring that statewide GHG emissions be reduced to 1990 levels by 2020. In adopting AB 32, the legislature determined the necessary GHG reductions for the state to make in order to sufficiently offset its contribution to the cumulative climate change problem to reach 1990 levels. AB 32 is the only legally mandated requirement for the reduction of greenhouse gases. As such, compliance with AB 32 is the adopted basis on which the agency can base its significance threshold for evaluating a project's GHG impacts.

As previously stated, on December 11, 2008, CARB adopted the Scoping Plan to achieve the goals of AB 32, which determined that achieving the 1990 emission level would require a reduction of GHG emissions of approximately 29 percent below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as "business as usual" or BAU).² However, in August 2012 CARB released revised estimates of the expected 2020 emissions reductions which were updated to account for the economic downturn since 2008 as well as reduction measures already approved and put in place. This reduced the projected 2020 emissions and thereby revised the BAU reduction necessary to achieve AB 32's goal of reaching 1990 levels by 2020 to 21 percent.

For the purposes of evaluating the proposed Project's GHG contribution and the potential to conflict with the implementation of an applicable GHG-reducing regulation (Standards of Significance 1 and 2), buildout of the proposed Project is compared to AB 32's goal of the achievement of at least a 21 percent reduction in GHG emissions by Project buildout as compared to business as usual. The City has determined that this reduction is consistent with the GHG emissions reduction targets established in CARB's AB 32 Scoping Plan. In addition, the Project is analyzed relative to the City's adopted CAP and Sustainability Element to determine the significance of GHG emissions and contribution to climate change.

METHODOLOGY

The resultant GHG emissions of the proposed Project were calculated using the California Emissions Estimator Model (CalEEMod), version 2013.2, computer program (see **Appendix E**). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for the use of government agencies, land use planners, and environmental professionals. This model was developed in coordination with the South Coast Air Quality Management District and is the most current emissions model approved for use in California by various other air districts.

The CNRA (2009c) has noted that impacts of GHG emissions should focus on the cumulative impact on climate change. The public notice states:

² Business as usual (BAU) is the project's projected GHG emissions level in 2020 under the assumption that consumption patterns and efficiencies are maintained at their 2005 levels. Under a BAU scenario, state, regional, and project-level efforts to reduce GHG emissions are not taken into consideration; rather, the BAU assumes the Year 2005 status quo.

While the Proposed Amendments do not foreclose the possibility that a single project may result in greenhouse gas emissions with a direct impact on the environment, the evidence before [CNRA] indicates that in most cases, the impact will be cumulative. Therefore, the Proposed Amendments emphasize that the analysis of greenhouse gas emissions should center on whether a project's incremental contribution of greenhouse gas emissions is cumulatively considerable.

Thus, the CEQA Amendments continue to make clear that the significance of GHG emissions is most appropriately considered on a cumulative level.

Sports Complex

The proposed Project includes a Sports Complex Overlay; however, a location for the overlay is not defined by the Project and it is not certain that it will be developed. Projected greenhouse gas emissions from the construction of a sports complex would be related to construction equipment (e.g., graders, excavators, tractor/loader/backhoes, rubber-tired dozers). Construction of a sports complex would not surpass significance thresholds with the imposition of mitigation. It should be noted that development of the sports complex would result in the reduction of other land uses in the Project area. Consequently, the total greenhouse gas emissions for the Project with the sports complex would depend on which uses in the Project are replaced with the sports complex.

Because the design of the sports complex is not currently known, the potential greenhouse gas impacts of its construction and operation cannot be precisely determined at this time. Pursuant to CEQA Guidelines Section 15145, if the impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact. Therefore, no further discussion is feasible at this time, and the sports complex component of the proposed Project is not addressed in the following impact analysis.

PROJECT IMPACTS AND MITIGATION MEASURES

Generate Greenhouse Gas Emissions That May Have a Significant Impact on the Environment (Standards of Significance 1 and 2)

Impact 5.7.1 The proposed Project would result in a net increase in GHG emissions, yet would not result in a significant impact on the environment. This impact is **potentially cumulatively considerable.**

Construction Emissions

Subsequent development proposed under the proposed Project would result in direct emissions of GHGs from construction. Since the actual phasing of future development allowed under the proposed Project is not known at this time, construction-related emissions were modeled assuming an equal distribution of proposed development over a ten-year period, which coincides with the City General Plan period. The proposed Project allows for a future growth for commercial, industrial, and office uses; office/retail uses; residential uses; and parks and schools. For the purposes of this analysis, the Project's nonresidential square footage and residential units are divided by 10 (the number of years between the current year [2014] and the year of the General Plan horizon [2023]) in order to roughly depict potential construction-related GHG emissions that may result in any given year over the span of the City General Plan. However, it is important to note that the proposed Project does not include any policy provisions requiring that

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its growth potential be attained. This impact discussion assumes full growth potential as identified in **Tables 2.0-1** and **2.0-2** of Section 2.0, Project Description, within ten years in order to present the maximum amount of GHG emissions possible.

Construction-generated emissions associated with the proposed Project were calculated using the CARB-approved CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. Modeling was based primarily on the default settings in the computer program for Sacramento County. Construction equipment requirements and usage rates used in the model were based on model default assumptions as shown in **Appendix E**.

The approximate quantity of annual GHG emissions generated by construction equipment utilized to build the development associated with the proposed Project is depicted in **Table 5.7-5**.

As shown, Project construction would result in the generation of approximately 23,780 metric tons of CO₂e over the course of ten years of construction. Once construction is complete, the generation of these GHG emissions would cease.

**TABLE 5.7-5
CONSTRUCTION-RELATED GREENHOUSE GAS EMISSIONS – METRIC TONS PER YEAR**

Construction	Carbon Dioxide (CO ₂)	Methane (CH ₄)	Nitrous Oxide (N ₂ O)	CO ₂ e
One Year of Construction	2,371	0.31	0.00	2,378
Ten Years of Construction Total	23,710	3.10	0.00	23,780

Source: CalEEMod version 2013.2. Refer to Appendix E for model data outputs.

Project Area GHG Emissions

Because the proposed Project's emissions were not included in the emissions inventory included in the City's CAP, the threshold of significance for operational-related GHG emissions is represented as the achievement of at least a 21 percent reduction in GHG emissions compared to BAU, as described above. In order to ascertain the achievement of a 21 percent reduction compared to BAU, quantification of Project-specific GHG emissions is required. Projects demonstrated to have reduced or mitigated Project-specific GHG emissions by at least 21 percent compared to BAU, consistent with GHG emissions reduction targets established in the CARB AB 32 Scoping Plan, would be determined to have a less than significant individual and cumulative impact on global climate change. To be conservative, total construction-generated GHG emissions were amortized over the estimated life of the Project and included with operational emissions for comparison to the significance thresholds. A project life of 30 years was assumed for the proposed Project.

As shown in **Table 5.7-6**, the long-term operations of the Project at buildout could produce 192,892 metric tons of CO₂e annually under BAU conditions, primarily from motor vehicles that travel to and from the site. This would contribute to a net increase in GHGs from the proposed Project. For purposes of this analysis, the total emissions of 192,892 metric tons of CO₂e per year are considered the BAU figure.

TABLE 5.7-6
OPERATIONAL GREENHOUSE GAS EMISSIONS UNDER BAU OPERATIONS – METRIC TONS PER YEAR

Source	CO ₂	CH ₄	N ₂ O	CO ₂ e
Construction (amortized 30 years of Project life)	790	0.10	0.00	793
Area	80	0.12	0.00	83
Energy	63,866	2.19	0.61	64,104
Mobile	117,375	10.86	0.00	117,603
Solid Waste	2,250	133.00	0.00	5,043
Water	4,796	2.26	1.36	5,266
Total	189,157	148.5	2	192,892

Source: CalEEMod version 2013.2. BAU emissions projections account for proposed Project-generated emissions at buildout without any greenhouse gas reduction measures; i.e., emissions presented are not adjusted for future improved CAFÉ standards (Pavley I) and Low Carbon Fuel Standards, or the 2011 Renewables Portfolio Standard. The Sacramento Municipal Utility District Year 2005 emissions factor of 769 pounds of CO₂ per megawatt of energy generated (California Climate Action Registry 2009) was used to account for energy-related BAU GHG emissions.

Refer to Appendix C for model data outputs.

Several State-led GHG emissions-reducing regulations have recently taken effect, and changes to regulations will continue to take effect in the near future that will substantially reduce GHG emissions. For instance, full implementation of AB 1493 (Pavley) will significantly reduce the amount of GHGs emitted from passenger vehicles. As passenger vehicles represent the single largest source of GHGs associated with the proposed Project, the anticipated reduction associated with State-led GHG emissions-reducing regulations represents 34,999 fewer metric tons per year of GHGs attributed to the Project (see **Table 5.7-7** and **Appendix E**).

The electricity provider for Elk Grove, the Sacramento Municipal Utility District (SMUD), is subject to California's Renewables Portfolio Standard. The RPS requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020, which will have the effect of reducing GHG emissions generated during energy production. For instance, in 2005, SMUD's CO₂ emission intensity factor equaled 769 pounds of CO₂ emitted for every megawatt of electricity produced (California Climate Action Registry 2009b). Largely due to SMUD's efforts to comply with California's RPS, SMUD's 2014 CO₂ emission intensity factor equals 590 pounds of CO₂ emitted for every megawatt of energy produced (CalEEMod version 2013.2), a reduction of 179 pounds of CO₂ per megawatt. SMUD's reduction of its CO₂ emission intensity factor between 2005 and 2014 would result in 12,170 fewer metric tons per year of GHGs attributed to the Project (see **Table 5.7-7** and **Appendix E**).

In addition to State-led regulations, the proposed land uses under the Project are centered around a core area located near the center of the Project area where the most intense land uses would be built surrounding a future extension of light rail. The core area would also be where most of the job-generating land uses would be located. The primary objective for the Southeast Policy Area Strategic Plan is to plan for a range of job opportunities that are supported by a balanced mix of residential densities and locally oriented retail uses. The Project also includes a mixed-use component, which would create a Village Center at the core of the Project area, combining aspects of the residential and nonresidential land uses to form a more urban development type, including the development of a future light rail station. These development areas are expected to make use of vertical space, with retail uses on the ground floor and office or residential uses on upper floors. The core area has been designed to be

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centrally located within the Project area and to be easily accessible by a range of uses and services.

As a result of these Project attributes, the amount of vehicle miles traveled, and thus GHG emissions, is substantially reduced. The anticipated reduction associated with the efficient land use design of the Project represents 28,552 fewer metric tons per year of GHGs attributed to the Project (see **Table 5.7-7** and **Appendix E**).

**TABLE 5.7-7
GHG REDUCTIONS FROM APPLICATION OF RECENT REGULATIONS**

California Legislation	CO ₂ e Emissions Reductions (Metric Tons/Year)
AB 1493 (Pavley) and Low Carbon Fuel Standard ¹	-34,999
2011 Renewables Portfolio Standard ²	- 12,170
Project Design Components ³	-28,552
Total	- 75,721

Notes:

¹ Emissions reductions from AB 1493 and Low Carbon Fuel Standard are derived from the difference between 2005 automobile emissions factors and 2020 automobile emissions factors contained in CalEEMod version 2013.2.

² Emissions reductions from the RPS are derived from the difference between SMUD's 2005 CO₂ emission intensity factor of 769 pounds of CO₂ per megawatt of energy generated (California Climate Action Registry 2009) and SMUD's 2014 CO₂ emission intensity factor of 590 pounds of CO₂ per megawatt of energy generated (CalEEMod version 2013.2).

³ To account for Project design components, a project diversity metric of 9.5 dwellings per residential acreage and 49 jobs per "job acre" is employed in the modeling software. In addition, an increase in density and improvement of pedestrian network is accounted as well as the assumption that all future residents of the Project are located one mile from a job center and one mile from mass transit. Data output is included as Appendix E.

Implementation of State-led GHG reduction measures such as Pavley, the Low Carbon Fuel Standard, the State RPS, and Project design components would reduce Project GHG emissions by 39.2 percent compared with BAU, which is well beyond the 21 percent reduction threshold.

Table 5.7-8 provides a summary of Project GHG reductions attributable to state regulations enacted subsequent to CARB determining the 21 percent reduction needed to achieve compliance with AB 32.

**TABLE 5.7-8
SUMMARY OF PROJECT GHG REDUCTIONS**

Emissions Reduction Summary	CO ₂ Emissions (Metric Tons/Year)
Total Business-as-Usual (BAU) Emissions	192,892
State-Led Regulatory Reduction	-47,169
Project Design Components	-28,552
Project Emissions After Reductions	117,171
Percentage Reduction from Business as Usual	39.2
Percentage Reduction Threshold for Less than Significant Determination	21

The GHG emissions from buildout of the proposed Project are projected to result in 117,171 metric tons of CO₂e per year (Tables 5.7-6 through 5.7-8). As projected, BAU emissions would be reduced by 39 percent, which is greater than the 21 percent threshold, so the Project is considered consistent with the State of California's ability to meet its GHG reduction goals.

Relationship to CAP Community-Wide Standards

As previously mentioned, for the City to achieve consistency with AB 32, future emissions will need to be reduced community-wide 15 percent below 2005 emissions by 2020 (to 627,162 metric tons CO₂e). The CAP identifies the reduction measures that the City will implement community-wide to achieve this level of reduction. Measures in the CAP identify project-level standards that the City will encourage or require through the plan review process.

Based on the streamlining provided by the CEQA Guidelines, the proposed Project is using the findings of the adopted CAP and certified Final SEIR (City of Elk Grove 2013a; 2013b) to evaluate the impact on CAP standards. By incorporating the applicable project-level standards identified in the CAP as mitigation measures, the proposed Project would not impede implementation of the CAP and would not result in a new significant cumulative impact related to compliance with an applicable GHG emissions reduction plan.

In addition to applicable CAP standards, the proposed Project would be required to comply with City of Elk Grove Municipal Code Chapter 23.54, Landscaping, which establishes the minimum number of trees that must be planted to enhance the appearance of developments. This requirement, while addressing aesthetics, also reduces GHG emissions, as there are energy- and GHG-reducing benefits from increased shading on buildings and pavements. Increased shading results in lower urban temperatures, thus reducing the urban heat island effect. Other co-benefits of Municipal Code Chapter 23.54 include carbon sequestration. Employees and patrons of the proposed Project would also have access to a complete transportation network made up of sidewalks, trails, and transit (including light rail), which will allow for the safe and effective movement of people and goods within the Project area and connect them with other parts of the City and region.

If the Project does not implement CAP mitigations, this would be a potentially significant impact. The Project would be required to implement existing City codes and policies, in addition to the applicable mitigations of the CAP that are identified below. The Project will be required to implement the following mitigations from the CAP to demonstrate a less than significant impact.

Mitigation Measures

MM 5.7.1 Prior to building permit approval, the City of Elk Grove Planning Department shall require that project applicants implement the following measures to reduce emissions of GHGs associated with the proposed Project, based on the referenced measures from the City's CAP and the City of Elk Grove Municipal Code:

- a. All buildings constructed shall achieve Tier 1 of Title 24, Part 1 green building standards to exceed minimum Title 24 energy efficiency standards by 15 percent, consistent with CAP Measure BE-6.
- b. Individual projects shall provide prewiring or conduit for solar photovoltaic (PV) in each future building, consistent with CAP Measure BE-10. The intent of prewiring for solar PV systems is to reduce barriers to later installation of

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on-site solar PVs. Future development under the proposed Project may also satisfy the intent of this mitigation by installing on-site solar PV systems.

- c. Future nonresidential land uses under the Project shall provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas, consistent with CAP Measure RC-1. Composting of a limited amount of food waste that may be generated as a byproduct of on-site food preparation shall be completed by agreement with a waste hauler. Cooking oils shall be directed off-site for reuse.
- d. All parking lots for future shopping centers or office developments constructed as part of the proposed Project shall include designated carpool parking spaces near store entries, implementing CAP Measure TACM-3.
- e. Future development under the Project shall provide bicycle parking at a ratio of 1 bicycle parking space per 20 vehicle parking spaces, consistent with CAP Measure TACM-5. Provision of additional bicycle support facilities such as lockers and shower facilities, consistent with voluntary CAP Measure TACM-5, may qualify the applicant for eligibility to request a reduction in the minimum number of parking spaces required, pursuant to Elk Grove Municipal Code Sections 23.58.060 and 23.16.037.
- f. During the design review process, future development applicants shall demonstrate compliance with CAP Measure TACM-5 by showing an analysis of office and mixed-use building connections and orientation to pedestrian paths, bicycle paths, and existing transit stops within a half mile of the Project site. As feasible, all such Project components shall orient development toward an existing transit, bicycle, or pedestrian corridor with minimum setbacks, or support equivalent pedestrian, bicycle, or alternative transportation through other methods.
- g. Future development under the proposed Project shall minimize setbacks from the street, provide pedestrian pathways, and use design features for entrances and parking lots to encourage pedestrian access and safety between transit facilities, consistent with CAP Measure TACM-5.
- h. Indoor water conservation measures shall be incorporated, such as use of low-flow toilets, urinals, and faucets.
- i. Future development under the Project shall ensure that low-water-use landscaping (i.e., drought-tolerant plants and drip irrigation) is installed. At least 75 percent of all landscaping plants shall be drought-tolerant as determined by a licensed landscape architect or contractor and in conformance with Chapters 14.10 and 23.54 of the Elk Grove Municipal Code.

Timing/Implementation: Prior to final design, building permit issuance

Enforcement/Monitoring: City of Elk Grove Planning Department

Since the projected BAU emissions would be reduced by 39 percent, which is greater than the 21 percent threshold, the Project is considered consistent with the State of California's ability to meet its GHG reduction goals. In addition, CAP conformance is demonstrated by mitigation

measure **MM 5.7.1**, which mandates CAP mitigation strategies. For these reasons, the proposed Project's contribution to cumulative GHG emissions is considered **less than cumulatively considerable**.

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REFERENCES

- California Climate Action Registry. 2009a. *California Climate Action Registry General Reporting Protocol Version 3.1*.
- . 2009b. *2004–2008 Utility Specific Emissions Rates*.
- CARB (California Air Resources Board). 2008a. *Climate Change Scoping Plan Appendices (Appendix F)*.
- . 2008b. *Public Hearing to Consider Adoption of the Regulation to Reduce Greenhouse Gas Emissions from Heavy-Duty Vehicles*. <http://www.arb.ca.gov/regact/2008/ghghdv08/ghgisor.pdf>.
- . 2010a. *Proposed Regulation to Implement the California Cap-and-Trade Program*.
- . 2010b. *Regional Greenhouse Gas Emission Reductions Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375*. September 23, 2010. <http://www.arb.ca.gov/board/books/2010/092310/10-8-2pres.pdf>.
- . 2011a. *Notice of Decision, Regional Greenhouse Gas Emissions Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375*. <http://www.arb.ca.gov/cc/sb375/notice%20of%20decision.pdf>.
- . 2011b. *Executive Order No. G-11-024, Relating to Adoption of Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375*. http://www.arb.ca.gov/cc/sb375/executive_order_g11024.pdf.
- . 2013. *California Greenhouse Gas Inventory for 2001–2011 – By Category as Defined in the 2008 Scoping Plan*. August 1, 2013. <http://www.arb.ca.gov/cc/inventory/data/data.htm>.
- City of Elk Grove. 2013a. *City of Elk Grove Public Climate Action Plan*.
- City of Elk Grove. 2013b. *City of Elk Grove Public Climate Action Plan Subsequent Environmental Impact Report*.
- CNRA (California Natural Resources Agency). 2009a. *2009 California Climate Adaptation Strategy*.
- . 2009b. *Final Statement of Reasons for Regulatory Action, Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB 97*. http://ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf.
- . 2009c. *Notice of Public Hearings and Notice of Proposed Amendment of Regulations Implementing the California Environmental Quality Act*. http://ceres.ca.gov/ceqa/docs/Notice_of_Proposed_Action.pdf.
- EFCTC (European Fluorocarbons Technical Committee). 2003. *Fluorocarbons and Sulphur Hexafluoride: Perfluorocarbons (PFCs) Fact Sheet*.
- EPA (US Environmental Protection Agency). 2009. *Endangerment and Cause or Contribute Finding for Greenhouse Gases under the Clean Air Act*. Last revised December 18, 2009.

- . 2010a. *Nitrous Oxide*. <http://www.epa.gov/nitrousoxide/scientific.html>.
- . 2010b. *High Global Warming Potential Gases*. <http://epa.gov/highgwp/>.
- . 2010c. *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, Final Rule*.
- . 2011a. *Climate Change – Greenhouse Gas Emissions: Carbon Dioxide*. <http://www.epa.gov/climatechange/emissions/co2.html>.
- . 2011b. *Methane*. <http://www.epa.gov/methane/scientific.html>.
- . 2012. *SmartWay Technology Program – Designated Tractors and Trailers*. <http://www.epa.gov/smartway/technology/designated-tractors-trailers.htm>.
- Fehr & Peers. 2014. *Draft Transportation Impact Analysis: Southeast Policy Area*.
- NHSTA (National Highway Safety Traffic Administration). 2009. *Average Fuel Economy Standards Passenger Cars and Light Trucks Model Year 2011, Final Rule*.
- Sacramento County. 2009. *Greenhouse Gas Emissions Inventory for Sacramento County*.
- SMAQMD (Sacramento Metropolitan Air Quality Management District). 2011. *Guide to Air Quality Assessment in Sacramento County*. Updated 2011.

5.7 GREENHOUSE GAS EMISSIONS

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