

3.7 GREENHOUSE GAS EMISSIONS

This chapter presents a summary of the current state of climate change science and greenhouse gas (GHG) emissions sources in California; a summary of applicable regulations; quantification of project-generated GHG emissions and discussion about their potential contribution to global climate change; and analysis of the project's resiliency to climate change-related risks.

Comments received in response to the Notice of Preparation related to GHG's included concerns about evaluating the project's consistency with existing plans and examining the project's effect on vehicle miles traveled (VMT) by directing growth to an area with higher VMT per household than the regional average.

3.7.1 Environmental Setting

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

The Physical Scientific Basis

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO₂), methane, nitrous oxide (N₂O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcing (Intergovernmental Panel on Climate Change [IPCC] 2014:3, 4).

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. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the lifetime of any particular GHG molecule is dependent on multiple variables and cannot be determined with any certainty, it is understood 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 55 percent is estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO₂ emissions remains stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere that ultimately result in climate change is not precisely known, but is enormous; no single project alone would measurably contribute to an incremental change in the global average temperature, or to global, local, or micro climates. Thus, from the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

GREENHOUSE GAS EMISSION SOURCES

GHG emissions are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural emissions sectors (California Air Resources Board [CARB] 2014a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (CARB 2014a). Emissions of CO₂ are byproducts of fossil fuel combustion. CH₄, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. Nitrous oxide is also largely attributable to agricultural practices and soil management. CO₂ sinks, or reservoirs, include vegetation and the ocean, which absorb CO₂ through sequestration and dissolution (CO₂ dissolving into the water), respectively, two of the most common processes for removing CO₂ from the atmosphere.

EFFECTS OF CLIMATE CHANGE ON THE ENVIRONMENT

According to the 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 to 7 degrees Fahrenheit (°F) by the end of the century, depending on future GHG emission scenarios (IPCC 2007). According to the California Natural Resources Agency (CNRA), temperatures in California are projected to increase 2 to 5 °F by 2050 and by 4 to 9 °F by 2100 (CNRA 2009).

Other environmental resources could be indirectly affected by the accumulation of GHG emissions and resulting rise in global average temperature. 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. According to *Our Changing Climate* (CNRA 2012), the snowpack portion of the state's water supply could potentially decline 30 to 90 percent by the end of the 21st century. An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the snowpack of the Sierra Nevada until spring would flow into the Central Valley concurrently with winter rainstorm events. This scenario would place more pressure on California's levee/flood control system.

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 conditions are no longer available (CNRA 2012).

Changes in precipitation patterns and increased temperatures are expected to alter the distribution and character of natural vegetation and associated moisture content of plants and soils. An increase in frequency of extreme heat events and drought are also expected. These changes are expected to lead to increased frequency and intensity of wildfires (CNRA 2012).

Another outcome of global climate change is sea level rise. Sea level rose approximately seven inches during the last century and it is predicted to rise an additional seven to 22 inches by 2100, depending on the future levels of GHG emissions (IPCC 2007). CNRA projects that sea levels along California will rise 5 to 24 inches by 2050 and 17 to 66 inches by 2100 (CNRA 2012).

Cal-Adapt is a climate change scenario planning tool developed by the California Energy Commission (CEC) that downscales global climate model data to local and regional resolution under two emissions scenarios: the A-2 scenario represents a business-as-usual future emissions scenario, and the B-1 scenario represents a lower GHG emissions future. According to Cal-Adapt, annual average temperatures in the project area are projected to rise by 3.6 to 6.3 °F by 2090, with the range based on low and high emissions scenarios (Cal-Adapt 2017a).

3.7.2 Regulatory Framework

GHG emissions and responses to global climate change are regulated by a variety of federal, State, and local laws and policies. Key regulatory and conservation planning issues applicable to the proposed project are discussed below.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks

On August 28, 2014, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) finalized a new national program that would reduce GHG emissions and improve fuel economy for all new cars and trucks sold in the U.S. (NHTSA 2012). EPA proposed the first-ever national GHG emissions standards under the federal Clean Air Act, and NHTSA proposed Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program will increase fuel economy to the equivalent of 54.5 miles per gallon for the fleet of cars and light-duty trucks by model year 2025, and, as of 2016, NHTSA and EPA are developing additional phases to address GHG emission standards for new medium- and heavy-duty trucks (NHTSA 2016). This program is currently under review by EPA, but at the time of publication of this DEIR had not been changed.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Executive Order S-3-05

Executive Order (EO) S-3-05, signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada 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 for the state. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

While dated, this executive order remains relevant because a more recent California Appellate Court decision, *Cleveland National Forest Foundation v. San Diego Association of Governments* (November 24, 2014) 231 Cal.App.4th 1056, examined whether it should be viewed as having the equivalent force of a legislative mandate for specific emissions reductions. The case is being reviewed by the California Supreme Court and oral arguments have been presented; however, a decision had not been released at the time of writing this DEIR. Therefore, the Appellate Court decision is not currently considered a citable precedent.

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

In September 2006, Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006, Assembly Bill (AB) 32. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 also requires that these reductions "...shall remain in effect unless otherwise amended or repealed. (b) It is the intent of the Legislature that the statewide greenhouse gas emissions limit continues in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020. (c) The [Air Resources Board] shall make recommendations to the Governor and the Legislature on how to continue reductions of greenhouse gas emissions beyond 2020." [California Health and Safety Code, Division 25.5, Part 3, Section 38551]

Assembly Bill 32 Climate Change Scoping Plan and Updates

In December 2008, CARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 118 million metric tons (MMT) of CO₂-equivalent (CO₂e) emissions, or approximately 21.7 percent from the State's projected 2020 emission level of 545 MMT of CO₂e under a business-as-usual scenario (this is a reduction of 47 MMT CO₂e, or almost 10 percent, from 2008 emissions). In May 2014, CARB released and subsequently adopted the *First Update to the Climate Change Scoping Plan* to identify the next steps in reaching AB 32 goals and evaluate progress that has been made between 2000 and 2012 (CARB 2014b:4 and 5). According to the update, California is on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (CARB 2014b: ES-2). The update also reports the trends in GHG emissions from various emissions sectors (e.g., transportation, building energy, agriculture).

On January 20, 2017, CARB released its proposed 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update), which lays out the framework for achieving the 2030 reductions as established in more recent legislation (discussed below). The proposed 2017 Scoping Plan Update identifies the GHG reductions needed by each emissions sector to achieve a statewide emissions level that is 40 percent below 1990 levels before 2030.

The proposed update also identifies how GHGs associated with proposed projects could be evaluated under CEQA. Specifically, it states that achieving "no net increase" in GHG emissions is the correct overall objective of projects evaluated under CEQA if conformity with an applicable local GHG reduction plan cannot be demonstrated. CARB recognizes that it may not be appropriate or feasible for every development project to mitigate its GHG emissions to no net increase and that this may not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change. In terms of current project-level thresholds, neither the Sacramento Metropolitan Air Quality Management District (SMAQMD) nor the City of Elk Grove have developed an evidenced-based, bright-line numeric threshold consistent with the State's long-term 2030 GHG goal. At the time of writing this environmental document, CARB has not yet approved its proposed 2017 Scoping Plan Update.

Senate Bill 375

Senate Bill (SB) 375, signed by Governor Schwarzenegger in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy, showing prescribed land use allocation in each MPO's Regional Transportation Plan. CARB, in consultation with the MPOs, is to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in their respective regions for 2020 and 2035.

The Sacramento Area Council of Governments (SACOG) serves as the MPO for Sacramento, Placer, El Dorado, Yuba, Sutter, and Yolo Counties, excluding those lands located in the Lake Tahoe Basin. The project site is in Sacramento County. SACOG adopted its Metropolitan Transportation Plan/Sustainable Communities Strategy 2035 in 2012, and completed an update adopted on February 18, 2016. SACOG was tasked by CARB to achieve a 9 percent per capita reduction compared to 2012 emissions by 2020 and a 16 percent per capita reduction by 2035, which CARB confirmed the region would achieve by implementing its SCS (CARB 2013).

Executive Order B-30-15

On April 20, 2015 Governor Brown signed EO B-30-15 to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor's EO aligns California's GHG reduction targets with those of leading international governments such as the 28-nation European Union, which adopted the same target in October 2014. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, as established in the California Global Warming Solutions Act of 2006 (Assembly Bill 32, discussed above). California's new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal of reducing emissions 80 percent below 1990 levels by 2050. This is in line with the scientifically established levels needed in the U.S. to limit global warming below 2

degrees Celsius, the warming threshold at which major climate disruptions are projected, such as super droughts and rising sea levels.

Senate Bill 32 and Assembly Bill 197 of 2016

In August 2016, Governor Brown signed SB 32 and AB 197, which serve to extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to authorize ARB to achieve a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the State's continuing efforts to pursue the long-term target expressed in EOs S-3-05 and B-30-15 of 80 percent below 1990 emissions levels by 2050.

Advanced Clean Cars Program

In January 2012, CARB approved the Advanced Clean Cars program which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of standards for vehicle model years 2017 through 2025. The new rules strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the state. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions than the statewide fleet in 2016 (CARB 2012).

Senate Bill X1-2, the California Renewable Energy Resources Act of 2011

SB X1-2 of 2011 requires all California utilities to generate 33 percent of their electricity from renewables by 2020. SB X1-2 sets a three-stage compliance period requiring all California utilities, including independently-owned utilities, energy service providers, and community choice aggregators, to generate 20 percent of their electricity from renewables by December 31, 2013; 25 percent by December 31, 2016; and 33 percent by December 31, 2020. SB X1-2 also requires the renewable electricity standard to be met increasingly with renewable energy that is supplied to the California grid from sources within, or directly proximate to, California. SB X1-2 mandates that renewables from these sources make up at least 50 percent of the total renewable energy for the 2011-2013 compliance period, at least 65 percent for the 2014-2016 compliance period, and at least 75 percent for 2016 and beyond. In October 2015, SB 350 was signed by Governor Brown, which requires retail sellers and publicly-owned utilities to procure 50 percent of their electricity from renewable resources by 2030.

California Building Efficiency Standards of 2016 (Title 24, Part 6)

Buildings in California are required to comply with California's Energy Efficiency Standards for Residential and Nonresidential Buildings established by CEC regarding energy conservation standards and found in Title 24, Part 6 of the California Code of Regulations. These standards were first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption and are updated on an approximately 3-year cycle to allow consideration and possible incorporation of new energy efficient technologies and methods. All buildings for which an application for a building permit is submitted on or after January 1, 2017 must follow the 2016 standards (CEC 2015a). Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions.

California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of in landfills, the State Legislature passed the California Integrated Waste Management Act of 1989 (AB 939), effective January 1990. According to AB 939, all cities and counties were required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000. Through other statutes and regulations, this 50

percent diversion rate also applies to State agencies. In order of priority, waste reduction efforts must promote source reduction, recycling and composting, and environmentally-safe transformation and land disposal. Per capita disposal rates for the City of Sacramento are below the target disposal rates established by AB 939 (1989; California Department of Resources Recycling and Recovery [CalRecycle] 2017).

In 2011, AB 341 modified the California Integrated Waste Management Act and directed CalRecycle to develop and adopt regulations for mandatory commercial recycling. The resulting Mandatory Commercial Recycling Regulation (2012) requires that on and after July 1, 2012, certain businesses that generate four cubic yards or more of commercial solid waste per week shall arrange recycling services. To comply with this requirement, businesses may either separate recyclables and self-haul them or subscribe to a recycling service that includes mixed waste processing. AB 341 also established a statewide recycling goal of 75 percent; the 50 percent disposal reduction mandate still applies for cities and counties under AB 939.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Sacramento Metropolitan Air Quality Management District

SMAQMD is the primary agency responsible for addressing air quality concerns in all of Sacramento County—its role is discussed further in Section 4.6, “Air Quality.” SMAQMD also recommends methods for analyzing project-generated GHGs in CEQA analyses and offers multiple potential GHG reduction measures for land use development projects. SMAQMD developed thresholds of significance to provide a uniform scale to measure the significance of GHG emissions from land use and stationary source projects in compliance with CEQA and AB 32. SMAQMD’s goals in developing GHG thresholds include ease of implementation; use of standard analysis tools; and emissions mitigation consistent with AB 32. However, since the passage of SB 32 and AB 197 and the associated adoption of a revised statewide emissions target of 40 percent below 1990 levels by 2030, SMAQMD has not developed new thresholds in compliance with this target.

Sacramento County

The Sacramento County 2030 General Plan includes the following policies applicable to this project and related to reducing GHG emissions (Sacramento County 2011).

- ▲ **Policy AQ-22.** Reduce greenhouse gas emissions from County operations as well as private development.
- ▲ **Policy LU-115.** It is the goal of the County to reduce GHG emissions to 1990 levels by the year 2020. This shall be achieved through a mix of State and local action.

Sacramento County Climate Action Plan

The Sacramento County CAP Strategy and Framework Document was adopted on November 9, 2011 and presents a framework for reducing GHG emissions and managing water and other resources to best prepare for a changing climate.

However, the CAP does not demonstrate the County’s ability to meet 2030 reduction goals (set by SB 32) and; subsequently, future target years (e.g., 2050) and does not meet all of the criteria in Section 15183.5(b)(1) as a plan for the reduction of GHG emissions. However, updates to the CAP have been initiated and the updated CAP (and associated key policies to be included in the policy document) will meet all of the criteria in Section 15183.5(b)(1) as a plan for the reduction of GHG emissions, and be consistent with new State legislation and guidance issued since the existing CAP was adopted in 2011, such as SB 32, EO B-30-15, and updates to the State’s Climate Change Scoping Plan.

The existing Sacramento County CAP does not meet all of the criteria in Section 15183.5(b)(1) as a plan for the reduction of GHG emissions. The County is currently preparing an updated CAP to meet all specified criteria.

City of Elk Grove

The City of Elk Grove General Plan includes the following policies applicable to this project and related to reducing GHG emissions (City of Elk Grove 2016).

- ▲ **Policy S-5.** Reduce greenhouse gas emissions from community-wide sources, including City facilities and operations, by a minimum of 15 percent below 2005 levels by 2020, consistent with the standards and requirements of AB 32.
- ▲ **Policy S-8.** Incorporate green building techniques and best management practices in the site design, construction, and renovation of all public projects. (Please see Climate Action Planning [CAP] reduction measures.)
 - **S-8-Action 1.** Require all new municipal developments to exceed state Title 24 Energy Efficiency Standards by 15 percent to the extent such efficiencies are possible.
 - **S-8-Action 2.** Design new municipal facilities to be at a minimum the baseline LEED certification.
 - **S-8-Action 3.** Implement measures identified during the energy audit process to reduce energy use in existing municipal buildings.
- ▲ **Policy S-9.** Support innovation and green building best management practices for all new private development.
 - **S-9-Action 1.** Require all new private developments to meet and (as determined feasible by the City) exceed state Title 24 Energy Efficiency Building Standards. (Please see CAP reduction measures.)
 - **S-9-Action 2.** Include a Green Building & Development Resource List and supporting materials with City planning and building permit applications that outline ways to integrate green building principles into project design.
- ▲ **Policy S-10.** Support higher-density, compact, residential development along transit by placing high-density residential or mixed-use sites near transit opportunities. (Please see CAP reduction measures.)
 - **S-10-Action 1.** Review the existing TOD designation in the Land Use Plan to determine if additional opportunities exist. Review should give consideration to the recommendations presented in the SACOG Blueprint Growth Principles. (Please see CAP.)
 - **S-10-Action 2.** Review the existing TOD designation in the Land Use Plan and revise the definition to emphasize mixed-use, compact, higher-density development around transit stations.
 - **S-10-Action 3.** Review and update the City's design guidelines to ensure appropriate design of TODs, and establish standards to prioritize pedestrians, cyclists, and public transit over private vehicles.
- ▲ **Policy S-11.** Support strategies that reduce reliance on single-occupancy private vehicles and promote the viability of alternative modes of transport. (Please see CAP reduction measures.)
 - **S-11-Action 2.** Require new commercial development for projects equal to and greater than 100,000 square feet to provide electric vehicle charging station and new residential development to pre-wire for plug-in electric vehicles.
 - **S-11-Action 4.** Ensure new multi-family and commercial developments provide bicycle parking and other bicycle support facilities appropriate for the users of the development.
- ▲ **Policy S-12.** Improve the health and sustainability of the community through improved regional air quality and reduced greenhouse gas emissions that contribute to climate change.

- **S-12 Action 1.** Ensure that new development is consistent with the City’s CAP.
- ▲ **Policy S-18.** Facilitate recycling, reduction in the amount of waste, and reuse of materials to reduce the amount of solid waste sent to landfill from Elk Grove. (Please see CAP reduction measures.)
 - **S-18-Action 4.** Enforce the Construction and Demolition (C&D) Debris Recycling Program for applicable construction projects and all demolition projects and increase the requirements to a 65 percent waste diversion.
- ▲ **Policy S-20.** Reduce the amount of water used by residential and nonresidential uses. (Please see CAP reduction measures.)
 - **S-20-Action 3.** Continue to require new commercial and multi-family residential developments to install low-flow fixtures.

Elk Grove Climate Action Plan

The Elk Grove CAP was adopted on March 27, 2013 by City Council and was incorporated into the Elk Grove General Plan Sustainability Element by reference. The CAP includes GHG emission reduction targets, strategies, and implementation measures developed to help reach identified targets. Reduction strategies address GHG emissions associated with the build environment, resource conservation, transportation, and municipal programs.

However, the CAP does not demonstrate the City’s ability to meet 2030 reduction goals (set by SB 32) and; subsequently, future target years (e.g., 2050). Thus, because of the anticipated buildout date of the SOIA area (or “project site”) being beyond 2020 this method of analysis would not demonstrate consistency with State GHG targets set by legislation (i.e., SB 32) or recommendations in the 2017 proposed Scoping Plan.

Updates to the CAP have been initiated as part of the general plan update process. The updated CAP (and associated key policies to be included in the policy document) is anticipated to be consistent with new State legislation and guidance issued since the existing CAP was adopted in 2013, such as SB 32, EO B-30-15, and updates to the State’s Climate Change Scoping Plan.

3.7.3 Environmental Impacts and Mitigation Measures

ANALYSIS METHODOLOGY

The conceptual land use plan (see Exhibit 2-4) was assumed for the purposes of modeling GHG emissions. GHG emissions associated with the conceptual land use scenario would be generated during project construction and by operation of the various land uses after construction is complete. Conceptual land use scenario-related operational emissions of GHG were estimated for the following sources: area sources (e.g., the use of landscape maintenance equipment), energy use associated with residential and nonresidential buildings, water and wastewater treatment and distribution, solid waste, and mobile sources.

Construction Emissions

Construction-related emissions of GHGs were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.1 computer program (California Air Pollution Control Officers Association [CAPCOA] 2016), as recommended by SMAQMD. Modeling was based on available information (e.g., land uses, acreage, number of units) for the conceptual land use scenario; reasonable assumptions based on typical construction activities; and default values in CalEEMod that are based on the project’s location and land use type.

For program-level analysis of annexation of lands where it is not possible to know how much construction activity would occur in a given year, SMAQMD recommends a conservative assumption that 25 percent of

the total land uses could be constructed in a single year (SMAQMD 2016). For the purposes of a conservative analysis, 25 percent of the land uses that could be developed were assumed to be constructed in the earliest possible construction year (2018). This assumption would be considered conservative because it is likely not possible that 25 percent of future land use in the proposed SOIA area could be under construction in 2018, and construction equipment fleet emissions are expected to decrease in the future with increased emission controls and standards. For a detailed description of model input and output parameters and assumptions, refer to Appendix C.

Operation Emissions

Operation-related emissions of GHG were also estimated using CalEEMod Version 2016.3.1. Operational emissions of GHGs were estimated for the following sources: area sources (e.g., landscaping-related fuel combustion sources), energy use (i.e., electricity and natural gas consumption), water use, solid waste, and mobile sources. Mobile-source emissions were calculated using CalEEMod Version 2016.3.1 with default trip generation and VMT rates (CAPCOA 2016). Indirect emissions associated with electricity and natural gas consumption were estimated using GHG emissions factors for Sacramento Municipal Utility District (SMUD) based on SMUD's Strategic Directive on Resource Planning (SMUD 2016). The project's level of electricity and natural gas usage were based on 2016 Title 24-adjusted consumption rates provided by CalEEMod for each land use type. Adjustments were based on the CEC estimate that single-family houses are 28 percent more energy efficient than 2013 Title 24 standards and non-residential buildings are 5 percent more efficient than 2013 Title 24 standards (CEC 2015b).

THRESHOLDS OF SIGNIFICANCE

The issue of global climate change is inherently a cumulative issue, as the GHG emissions of individual projects cannot be shown to have any material effect on global climate. Thus, the project's impact to climate change is addressed only as a cumulative impact.

CEQA Guidelines Section 15064 and relevant portions of Appendix G recommend that a lead agency consider a project's consistency relevant, adopted plans, and discuss any inconsistencies with applicable regional plans, including plans to reduce GHG emissions. In Appendix G of the State CEQA Guidelines, two questions are provided to help assess if the project would result in a potentially significant impact on climate change. These questions ask whether the project would:

- ▲ generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or
- ▲ conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs?

In California, some counties, cities, and air districts have developed guidance and thresholds of significance for determining significance of GHG emissions that occur within their jurisdiction. LAFCo is the CEQA Lead Agency for the SOIA project and is, therefore, responsible for determining whether an impact would be considered significant.

As discussed above, the City of Elk Grove CAP does not demonstrate the City's ability to meet 2030 reduction goals (set by SB 32) and; subsequently, future target years (e.g., 2050). Thus, for projects such as the SOIA that would be built out beyond 2020 this method of analysis would not demonstrate consistency with State GHG targets set by legislation (i.e., SB 32) or recommendations in the 2017 Scoping Plan Update.

If the lead agency does not have a qualified CAP that can be used to show consistency with State GHG targets, then the local air district's thresholds may be used, if available and applicable. SMAQMD has developed thresholds of significance for development projects that occur within the jurisdiction of SMAQMD that are tied to target year 2020 and no further. Thus, with respect to SB 32 and 2030 GHG reduction goals of 40 percent below 1990 levels, SMAQMD has not developed numeric, bright-line thresholds of significance

for GHG emissions generated during project construction or operation. Nonetheless, SMAQMD recommends that lead agencies quantify and disclose project-related GHG emissions and make a significance determination of these emissions. Because of the cumulative effect of GHGs, SMAQMD recommends amortizing a project's construction emissions over the operational lifetime of the project (SMAQMD 2016). The sum of estimated amortized construction emissions and annual operational emissions per year is assumed to reflect the total annual GHG emissions attributable to the project.

As discussed above, recent passage of SB 32 in September 2016 set a new State GHG emissions target for the year 2030 at 40 percent below 2020 levels. Thus, for projects that would generate emissions beyond 2020, significance would be determined based on a project's compliance with this target. An impact would be determined significant if a project were to conflict with or prevent the State from meeting 2030 GHG reduction targets.

To set the stage for how California would meet targets set forth by SB 32, ARB's 2017 Scoping Plan Update suggests several approaches for showing a project's consistency with State targets. The following is related to project-level CEQA analyses (CARB 2017:136):

Absent conformity with an adequate geographically specific GHG reduction plan, [ARB] recommends that all new land use development implement all feasible measures to reduce GHG emissions....

[ARB] believes that achieving no net increase in GHG emissions is the correct overall objective, but it may not be appropriate or feasible for every development project. An inability to mitigate a project's GHG emissions to zero does not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA. Lead agencies may develop evidenced-based bright-line numeric thresholds—consistent with the [2017 Scoping Plan Update] and the State's long-term GHG goals—and projects with emissions over that amount may be required to incorporate on-site design features and mitigation measures that avoid or minimize project emissions to the degree feasible. Otherwise, a performance-based metric using a climate action plan or other plan to reduce GHG emissions is appropriate.

In relation to the proposed 2017 Scoping Plan Update language above, the City has prepared a geographically-specific GHG reduction plan; however, as explained above, the plan does not meet the targets set forth by SB 32 and; therefore, cannot be used to demonstrate consistency with future target years (i.e., 2030 or 2050). Further, neither SMAQMD nor the City have developed an evidenced-based bright-line numeric threshold or performance-based metric based on an applicable CAP, consistent with the State's long-term GHG goals. Therefore, relying on consistency with a qualified GHG reduction plan or comparing project-generated emissions to a bright-line threshold are not options for this analysis. Consequently, based on the overall objective of the 2017 Scoping Plan Update, a "no net increase" threshold is applied for the purposes of this analysis. The intent of this analysis is not to present the use of a no net increase threshold as a generally applied threshold of significance for GHG impacts. Its use herein is related directly to the facts surrounding the project and availability of reliance on other threshold options. A project that results in no net increase in GHG emissions would not result in a substantial increase in GHGs or conflict with local or State plans adopted for the purpose of reducing GHG emissions.

IMPACT ANALYSIS

Impact 3.7-1: Project-generated greenhouse gas emissions.

Future development of the SOIA area upon annexation is estimated to generate 5,116 MTCO_{2e} from construction activities and 71,113 MTCO_{2e} operation-related emissions at assumed buildout of the conceptual land use plan. Total emissions attributed to the conceptual land use plan would be 71,318 MTCO_{2e}/year with combined amortized construction emissions. This level of GHG emissions has the potential to result in a considerable contribution to cumulative emissions related to global climate change and conflict with State GHG reduction targets established for 2030 and 2050. This cumulative impact would be significant and the project's contribution would be **cumulatively considerable**.

While approval of the SOIA would not result in physical changes to the environment, approval of the SOIA would remove an obstacle to subsequent annexation and development of the site. GHG emissions associated with the conceptual land use scenario would be generated during construction and operation. Construction activities would result in the generation of GHG emissions from the use of heavy-duty off-road construction equipment, delivery trucks associated with materials transport, and vehicle use during worker commute.

Operation of the conceptual land use scenario would result in mobile-source GHG emissions associated with vehicle trips to and from the conceptual land uses, and within the SOIA area; area-source emissions from the operation of landscape maintenance equipment; energy-source emissions from the consumption of electricity and natural gas; water-related energy consumption associated with water use and the conveyance and treatment of wastewater; waste-generated emissions from the transport and disposal of solid waste.

Emissions were quantified for each year of construction and project operations. Modeling results are shown below in Table 3.7-1.

Table 3.7-1 Conceptual Land Use Scenario Greenhouse Gas Emissions

| Project Phase | GHG Emissions |
|----------------------------------------------------------------------------------|------------------------------|
| Construction GHG Emissions | MTCO _{2e} |
| Maximum Annual Construction Emissions ¹ | 1,279 |
| Total Conceptual Land Use Scenario Construction Emissions | 5,116 |
| Amortized over 25 Years | 205 |
| Operational GHG Emissions | MTCO _{2e} (MT/year) |
| Area | 32 |
| Energy | 16,515 |
| Mobile | 51,149 |
| Waste | 2,408 |
| Water | 1,008 |
| Total Project Annual GHG Emissions (Amortized Construction + Operational) | 71,318 |
| Emissions per Service Population² | 7.2 |

Notes: Totals may not add because of rounding; CO_{2e} = carbon dioxide equivalent; MT = metric tons; GHG = greenhouse gas.

¹ Total construction emissions estimated by multiplying the annual worst-case constructions (construction emissions associated with development of 25% of the total proposed land uses) by four.

² Total service population consists of 5,540 residents and 4,359 employees.

Source: Modeled by Ascent Environmental 2017

As shown in Table 3.7-1 above, the project would generate a total of 5,116 MTCO_{2e} over the duration of construction activities and annual operational emissions of 71,113 MTCO_{2e}. Total construction emissions were amortized over the project's 25-year life, consistent with guidance from SMAQMD (SMAQMD 2016). Thus, the level of annual GHG emissions associated with the conceptual land use scenario, including amortized construction-related emissions, is estimated to be approximately 71,318 MTCO_{2e}/year.

As discussed in the "Significance Criteria" section above, currently no bright line threshold or geographically-specific GHG reduction plan is available that could be used to evaluate project-generated GHG emissions beyond 2020- (assumed buildout date is post 2020), the year for which SMAQMD thresholds are based and the City of Elk Grove CAP shows City GHG emission targets in line with State targets.

Therefore, because the project would generate 71,318 MTCO_{2e}/year, it could conflict with the State's ability to meet the goals of SB 32 and project-generated GHG emissions would be considered **cumulatively considerable and significant**.

Mitigation Measure 3.7-1a: On-site GHG emission reduction measures.

At the time of any application to annex territory within the Bilby Ridge SOIA area, the City of Elk Grove shall require that the applicants to implement all reduction measures necessary to comply with the City of Elk Grove CAP in place at the time and implement the following additional measures if they are not included in the City of Elk Grove CAP:

Construction

- ▲ Enforce idling time restrictions for construction vehicles
- ▲ Require construction vehicles to operate with the highest tier engines commercially available
- ▲ Divert and recycle construction and demolition waste, and use locally-sourced building materials with a high recycled material content to the greatest extent feasible
- ▲ Minimize tree removal, and mitigate indirect GHG emissions increases that occur because of vegetation removal, loss of sequestration, and soil disturbance
- ▲ Utilize existing grid power for electric energy rather than operating temporary gasoline/diesel powered generators
- ▲ Increase use of electric and renewable fuel powered construction equipment and require renewable diesel fuel where commercially available
- ▲ Require diesel equipment fleets to be lower emitting than any current emission standard

Operation

- ▲ Comply with lead agency's standards for mitigating transportation impacts under SB 743
- ▲ Require on-site EV charging capabilities for parking spaces serving the project to meet jurisdiction-wide EV proliferation goals
- ▲ Allow for new construction to install fewer on-site parking spaces than required by local municipal building code, if appropriate
- ▲ Dedicate on-site parking for shared vehicles
- ▲ Provide adequate, safe, convenient, and secure on-site bicycle parking and storage in multi-family residential projects and in non-residential projects

- ▲ Provide on- and off-site safety improvements for bike, pedestrian, and transit connections, and/or implement relevant improvements identified in the City of Elk Grove Bicycle, Pedestrian, and Trails Master Plan
- ▲ Require on-site renewable energy generation
- ▲ Prohibit wood-burning fireplaces in new development, and require replacement of wood-burning fireplaces for renovations over certain size developments
- ▲ Require cool roofs and “cool parking” that promotes cool surface treatment for new parking facilities as well as existing surface lots undergoing resurfacing
- ▲ Require solar-ready roofs
- ▲ Require organic collection in new developments
- ▲ Require low-water landscaping in new developments. Require water efficient landscape maintenance to conserve water and reduce landscape waste.
- ▲ Achieve Zero Net Energy performance targets before dates required by CALGreen
- ▲ Where ZNE is deemed infeasible, building energy may also be reduced in the following ways:
 - ▲ Reduce building energy-related GHG emissions through the use of on-site renewable energy (e.g., solar photovoltaic panels) where technologically feasible and at a minimum of 15 percent of the project’s total energy demand. Building design, landscape plans, and solar installation shall take into account solar orientation, and building roof size to maximize solar exposure.
 - ▲ Provide incentives to future residents to purchase Energy Star™ appliances (including clothes washers, dish washers, fans, and refrigerators).
 - ▲ Install high efficiency lighting (i.e., light emitting diodes) in all streetlights, security lighting, and all other exterior lighting applications.
 - ▲ Provide electrical outlets on the exterior of project buildings to allow sufficient powering of electric landscaping equipment.
 - ▲ Install low-flow kitchen faucets that comply with CALGreen residential voluntary measures (maximum flow rate not to exceed 1.5 gallons per minute at 60 psi).
 - ▲ Install low-flow bathroom faucets that exceed the CALGreen residential mandatory requirements (maximum flow rate not to exceed 1.5 gallons per minute at 60 psi)
 - ▲ Install low-flow toilets that exceed the CALGreen residential mandatory requirements (maximum flush volume less not to exceed 1.28 gallons per flush)
 - ▲ Install low-flow showerheads that exceed the CALGreen residential mandatory requirements (maximum flow rate not to exceed 2 gallons per minute at 80 psi)
 - ▲ Reduce turf area and use water-efficient irrigation systems (i.e., smart sprinkler meters) and landscaping techniques/design.
 - ▲ Require new construction, including municipal building construction, to achieve third-party green building certifications, such as the GreenPoint Rated program or the LEED rating system

- ▲ Require the design of bike lanes to connect to the regional bicycle network
- ▲ Expand urban forestry and green infrastructure in new land development
- ▲ Require preferential parking spaces for park and ride to incentivize carpooling, vanpooling, commuter bus, electric vehicles, and rail service use
- ▲ Require a transportation management plan for specific plans which establishes a numeric target for non-SOV travel and overall VMT
- ▲ Develop a rideshare program targeting commuters to major employment centers
- ▲ Require the design of bus stops/shelters/express lanes in new developments to promote the usage of mass-transit
- ▲ Require gas outlets in residential backyards for use with outdoor cooking appliances such as gas barbeques if natural gas service is available
- ▲ Require the installation of electrical outlets on the exterior walls of both the front and back of residences to promote the use of electric landscape maintenance equipment
- ▲ Require the design of the electric boxes in new residential unit garages to promote electric vehicle usage
- ▲ Require electric vehicle charging station (conductive/inductive) and signage for non-residential developments
- ▲ Provide electric outlets to promote the use of electric landscape maintenance equipment to the extent feasible on parks and public/quasi-public lands
- ▲ Require each residential unit to be “solar ready,” including installing the appropriate hardware and proper structural engineering
- ▲ Require the installation of energy conserving appliances such as on-demand tank-less water heaters and whole-house fans
- ▲ Require each residential and commercial building equip buildings with energy efficient AC units and heating systems with programmable thermostats/timers
- ▲ Require large-scale residential developments and commercial buildings to report energy use, and set specific targets for per-capita energy use
- ▲ Require each residential and commercial building to utilize low flow water fixtures such as low flow toilets and faucets
- ▲ Require the use of energy-efficient lighting for all street, parking, and area lighting
- ▲ Require the landscaping design for parking lots to utilize tree cover
- ▲ Incorporate water retention in the design of parking lots and landscaping
- ▲ Require the development project to propose an off-site mitigation project which should generate carbon credits equivalent to the anticipated GHG emission reductions. This would be implemented via an approved protocol for carbon credits from CAPCOA, CARB, or other similar entities determined acceptable by the local air district

- ▲ Require the project to purchase carbon credits from the CAPCOA GHG Reduction Exchange Program, American Carbon Registry, Climate Action Reserve or other similar carbon credit registry determined to be acceptable by the local air district
- ▲ Encourage the applicant to consider generating or purchasing local and California-only carbon credits as the preferred mechanism to implement its off-site mitigation measure for GHG emissions and that will facilitate the State's efforts in achieving the GHG emission reduction goal

Evidence of compliance with this mitigation measure shall be provided in the annexation application to LAFCo.

Mitigation Measure 3.7-1b: Purchase carbon offsets.

In addition to Mitigation Measure 3.7-1a, at the time of any application to annex territory within the Bilby Ridge SOIA area, the City of Elk Grove shall require that the applicants offset GHG emissions to zero by funding activities that directly reduce or sequester GHG emissions or, if necessary, obtaining carbon credits. Evidence of compliance with this mitigation measure shall be provided in the annexation application to LAFCo.

To the degree a project relies on GHG mitigation measures, SMAQMD and CARB recommend that lead agencies prioritize on-site design features (Mitigation Measures 3.7-1a and 3.3-2) and direct investments in GHG reductions near the project, to help provide potential air quality and economic co-benefits locally. For example, direct investment in a local building retrofit program can pay for cool roofs, solar panels, solar water heaters, smart meters, energy efficient lighting, energy efficient appliances, energy efficient windows, insulation, and water conservation measures for homes within the geographic area of the project. Other examples of local direct investments include financing installation of regional electric vehicle charging stations, paying for electrification of public school buses, and investing in local urban forests. However, it is critical that any such investments in actions to reduce GHG emissions are real and quantifiable. Where further project design or regional investments are infeasible or not proven to be effective, it may be appropriate and feasible to mitigate project emissions through purchasing and retiring carbon credits issued by a recognized and reputable accredited carbon registry.

The CEQA Guidelines recommend several options for mitigating GHG emissions. State CEQA Guidelines Section 15126.4(C)(3) states that measures to mitigate the significant effects of GHG emissions may include "off-site measures, including offsets that are not otherwise required..." Through the purchase of GHG credits through voluntary participation in an approved registry, GHG emissions may be reduced at the project level. GHG reductions must meet the following criteria:

- ▲ Real—represent reductions actually achieved (not based on maximum permit levels),
- ▲ Additional/Surplus—not already planned or required by regulation or policy (i.e., not double counted),
- ▲ Quantifiable—readily accounted for through process information and other reliable data,
- ▲ Enforceable—acquired through legally-binding commitments/agreements,
- ▲ Validated—verified through accurate means by a reliable third party, and
- ▲ Permanent—will remain as GHG reductions in perpetuity.

In partnership with offset providers, any future project applicant shall purchase carbon offsets (from available programs that meet the above criteria) that fully offset the project's remaining (i.e., post implementation of Mitigation Measures 3.7-1a and 3.3-2) operational GHG emissions over the 25-year project life.

It should be noted that purchases of offsets would occur once and remain effective throughout the lifetime of the project (i.e., 25 years per SMAQMD guidance). In order for an offset to be considered viable, it must exhibit "permanence." To adequately reduce emissions of GHGs, carbon offsets must be able to demonstrate the ability to counterbalance GHG emissions over the lifespan of a project or "in perpetuity." For example, the purchase of a carbon offset generated by a reforestation project would entail the replanting or maintenance of carbon-sequestering trees, which would continue to sequester carbon over several years, decades, or centuries

(Forest Trends 2015). It is important to note that the offsets purchased must offer an equivalent GHG reduction benefit annually, as opposed to a one-time reduction.

Before issuing building permits for development within the SOIA area, the City of Elk Grove shall confirm that the project applicant or its designee has fully offset the project's remaining (i.e., post implementation of Mitigation Measures 3.7-1a and 3.3-2) operational GHG emissions over the 25-year project life associated with such building permits by relying upon one of the following compliance options, or a combination thereof:

- ▲ demonstrate that the project applicant has directly undertaken or funded activities that reduce or sequester GHG emissions that are estimated to result in GHG reduction credits (if such programs are available), and retire such GHG reduction credits in a quantity equal to the remaining operational GHG emissions;
- ▲ provide a guarantee that it shall retire carbon credits issued in connection with direct investments (if such programs exist at the time of building permit issuance) in a quantity equal to the remaining operational GHG emissions;
- ▲ undertake or fund direct investments (if such programs exist at the time of building permit issuance) and retire the associated carbon credits in a quantity equal to the remaining operational GHG emissions; or
- ▲ if it is impracticable to fully offset operational emissions through direct investments or quantifiable and verifiable programs do not exist, the project applicant or its designee may purchase and retire carbon credits that have been issued by a recognized and reputable, accredited carbon registry in a quantity equal to the remaining operational GHG Emissions.

Significance after Mitigation

Implementation of identified actions in Mitigation Measures 3.7-1a and 3.3.2 could reduce GHG emissions. However, these mitigation measures could not mitigate GHG emissions to a level of no net increase. Thus, the project would still result in GHG emissions that would be considered cumulatively considerable.

Implementation of Mitigation Measure 3.7-1b would require the purchase of off-site carbon credits to reduce the remaining operational GHG emissions. Thus, implementation of all of the above mitigation measures would offset project GHG emissions and, therefore; would not conflict with City of Elk Grove's climate planning efforts, ARB's proposed 2017 Scoping Plan Update, or established state GHG reduction targets. Thus, the project's contribution to cumulative GHG emission after mitigation could be mitigated through implementation of both mitigation measures. However, Sacramento LAFCo cannot guarantee the success of these mitigation measures for offsetting project emissions. Confirmation of compliance with the mitigation measures would require monitoring of the GHG reduction actions as development occurs. LAFCo would not be able to verify or enforce these measures after annexation. The City of Elk Grove is also in the process of updating its CAP and may alter the mitigation approach for the development of this project (after annexation) to match the updated CAP GHG reduction measures. Because of this uncertainty in achieving no net increase in GHG emissions, the project's contribution to this significant cumulative impact would be **cumulatively considerable** and **significant and unavoidable**.

Impact 3.7-2: Impacts of climate change on the project.

The project is not located within an area projected to experience a substantial increase in wildland fire risk or flooding as a result of climate changes in the future. Anticipated changes in future climate patterns are not anticipated to have any substantial adverse effects on the project. Therefore, the impacts of climate change on the project would be **less than significant**.

As discussed previously in this section, there is substantial evidence that human-induced increases in GHG concentrations in the atmosphere have led to increased global average temperatures (climate change)

through the intensification of the greenhouse effect, and associated changes in local, regional, and global average climatic conditions.

Although there is a strong scientific consensus that global climate change is occurring and influenced by human activity, there is less certainty as to the timing, severity, and potential consequences of the climate phenomena, particularly at specific locations. Scientists have identified several ways in which global climate change could alter the physical environment in California (CNRA 2012). These include:

- ▲ increased average temperatures;
- ▲ modifications to the timing, amount, and form (rain vs. snow) of precipitation;
- ▲ changes in the timing and amount of runoff;
- ▲ reduced water supply;
- ▲ deterioration of water quality; and
- ▲ elevated sea level.

Several of these changes may translate into a variety of issues and concerns that may affect the project, including:

- ▲ increased frequency and intensity of wildfire as a result of changing precipitation patterns and temperatures;
- ▲ reliability in water supply associated with changes to precipitation and snowmelt patterns; and
- ▲ increased risk of flood associated with sea level rise.

Annual average temperatures in Sacramento County are projected to increase steadily. According to Cal-Adapt, Sacramento County is projected to experience a temperature increase of 1.5 °F by 2050 and 3.5 °F by 2090 under the low-emissions scenario, and an increase of 4.1 °F by 2050 and 6.2 °F by 2090 under the high-emissions scenario, as compared to the 1961 to 1990 baseline period (Cal-Adapt 2017a).

Increased temperature is expected to lead to secondary climate change impacts, including increases in the frequency, intensity, and duration of extreme heat days and multi-day heat waves/events in California. Cal-Adapt defines the extreme heat day threshold for Sacramento County as 100 °F or higher. An extreme heat day is defined as a day between April through October where the maximum temperature exceeds the 98th historical percentile of maximum temperature based on daily temperature data from 1961 to 1990 (i.e., 100 °F). From the data collected from 1961 to 1990, Sacramento County has a historical average of four extreme heat days a year. Sacramento County is already experiencing an increase in the frequency of extreme heat days per year with a current average of eight to nine extreme heat days per year from 2010 to 2016, with 18 extreme heat days in 2015 (Cal-Adapt 2017a).

Cal-Adapt data shows a range of projected increases in the number of extreme heat days by 2099, all of which are at least four times the historical (1961-1990) average in both emissions scenarios. The projected annual average number of extreme heat days under the low-emissions scenario is approximately 15 days per year in 2050 and between 19 to 45 days per year at the end of the century. Under the high-emissions scenario, Cal-Adapt predicts that Sacramento County will experience 25 to 31 extreme heat days per year in 2050 and 50 to 67 days per year by 2099 (Cal-Adapt 2017a).

Any future project within the SOIA area would be required to meet the 2016 Title 24 building energy standards (or current Title 24 building energy standards), which require well-insulated buildings and high-efficiency heating, ventilation, and air conditioning units.

Fire risk data for the State have been projected for the years 2020, 2050, and 2085. The data models the areas that are projected to experience increases in area burned compared to the expected burn rate without climate change. Based on these maps, the SOIA area is not located within an area projected to experience greater than expected wildland fire risks (Cal-Adapt 2017b). However, wildfires within the Sierra Nevada and

areas outside the County affect air quality in Sacramento County. Wildland fires produce substantial emissions of particulate matter (e.g., smoke, soot), which may cause health effects including restricted breathing and aggravation of existing respiratory and cardiovascular diseases in the short-term, and alterations to immune systems and cancer from chronic exposure. Particulate matter from wildfire dissipates throughout the Central Valley degrading air quality conditions for short or extended periods of time. The duration of wildfire-related particulate matter in the County's air is linked to wind patterns originating from the Sacramento-San Joaquin Delta. Colloquially known as the "Delta Breeze," oceanic winds are channeled through the Delta into Sacramento County, and help disperse air pollutants north of the Sacramento Valley; however, during about half of the days from July to September, a phenomenon called the "Schultz Eddy" prevents this from occurring. These natural phenomena affect the severity of wildfire-related air pollution in Sacramento County (SMAQMD 2016). For example, during the summers of 2013 through 2015, several wildfire incidents occurred in Northern California that increased levels of particulate matter within Sacramento County.

Fire planning and preparation activities in Elk Grove are primarily undertaken by the Cosumnes Community Services District Fire Department (CCSDFD). CCSDFD's Fire Prevention Bureau provides community prevention services related to fire, life, occupational hazards, property damage, and environmental safety.

The City of Elk Grove General Plan includes the following policies in the Safety Element related to addressing wildfires and mitigating their risks (City of Elk Grove 2016):

- ▲ **SA-37.** Cooperate with the Cosumnes Community Services District (CCSD) Fire Department to reduce fire hazards, assist in fire suppression, and promote fire safety in Elk Grove.
 - **SA-37-Action 1.** Review new development for adequate water supply and pressure, fire hydrants, and access to structures by firefighting equipment and personnel.
 - **SA-37-Action 2.** Review projects for compliance with the California Fire Code and the life safety provisions of the California Building Code as part of the building permit process.
 - **SA-37-Action 4.** Require, where appropriate, on-site fire suppression systems for all new commercial and industrial development to reduce the dependence on fire department equipment and personnel.
 - **SA-37-Action 6.** The City shall require the installation of earthquake-triggered automatic gas shut-off sensors in high-occupancy facilities and in industrial and commercial structures.
 - **SA-37-Action 7.** Work with the CCSD Fire Department to enforce all existing codes regarding fire protection, including building inspection and vegetation management.

Through CCSDFD's Fire Prevention Bureau fire protection services and the policies listed in the City's General Plan, the project is not considered to be located in an area with a substantial risk to wildland fires or hazards as programs and policies are in place to address such risks.

With regards to increases in flood risk, the project is not located in a coastal zone where an increased threat of flooding may occur because of sea level rise (Cal-Adapt 2017c). However, Sacramento County is vulnerable to riverine flooding. Riverine flooding generally occurs as result of prolonged rainfall, or rainfall combined with snowmelt and/or already saturated soils from previous rain events. Riverine flooding can occur anytime from November through April, and is largely caused by heavy and continued rains. Intense storms may overwhelm local waterways, as well as threaten the integrity of flood control structures.

Sacramento County is considered highly likely to experience catastrophic flooding as a result of riverine flooding. Because of the project area's relatively flat, generally low-lying terrain and numerous waterways, historically, flooding has constituted the most frequent natural hazard experienced by Sacramento County. While it is uncertain precisely how and to what extent climate change will affect flooding events in Sacramento County, it is reasonable to expect that an increase in flooding could have serious ramifications,

because the area is already considerably vulnerable. More rapid and earlier snowmelt, or increased potential for high-intensity storm events, compared to historical trends, could potentially place additional strain on the components of flood control systems (e.g., levees, dams), and increase the likelihood of flooding in Sacramento County. Refer to Section 3.8, “Hydrology, Drainage, and Water Quality” for more details about flood protection around the project.

Based on currently-available data, the project is not located within an area projected to experience a substantial increase in wildland fire risk or flooding as a result of climate changes in the future. Anticipated changes in future climate patterns are not anticipated to have any substantial effects on the project. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

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