4.6 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

4.6.1 Introduction

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

The comment letter received from the Placer County Air Pollution Control District (PCAPCD) in response to the Notice of Preparation mentions that determination of significance and mitigation of GHG emissions should be addressed, using the PCAPCD CEQA Handbook. This letter was dated December 19, 2013. In October 2016, PCAPCD released an updated Handbook which was subsequently approved by the PCAPCD Board in August 2017. The analysis contained in this section addresses this comment.

4.6.2 Environmental Setting

GHG EMISSIONS AND CLIMATE CHANGE

The Physical Scientific Basis

Certain gases in the earth's atmosphere, classified as GHG emissions, 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 back 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 (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Human-caused emissions of these GHGs in excess of natural ambient concentrations are believed 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 forcings together (Intergovernmental Panel on Climate Change [IPCC] 2014:3, 5).

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 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 exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through

sequestration and dissolution, respectively, two of the most common processes of CO_2 sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is sequestered through ocean and land uptakes every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remains stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice it to say, the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climates. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

Greenhouse Gas Emission Sources

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, 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 CO_2 are, largely, byproducts of fossil fuel combustion. CH_4, 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. N_2O is also largely attributable to agricultural practices and soil management. Additionally, high-global warming potential (GWP) gases have atmospheric insulative properties that are hundred to tens of thousands of times greater than that of CO_2. HFCs, PFCs, and SF_6 are some of the most common types of high-GWP gases and result from a variety of industrial processes. HFCs and PFCs are used as refrigerants and can be emitted through evaporation and leakage. SF_6 is a powerful electrical insulator used in power transmission and semiconductor manufacturing and is emitted through evaporation and leakage into the atmosphere.

EFFECTS OF CLIMATE CHANGE ON THE ENVIRONMENT

IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme to provide the world with a scientific view on climate change and its potential effects. According to the IPCC global average temperature is expected to increase relative to the 1986-2005 period by 0.3–4.8 degrees Celsius (°C) (0.5-8.6 degrees Fahrenheit [°F]) by the end of the 21st century (2081-2100), depending on future GHG emission scenarios (IPCC 2014: SPM-8). This temperature range represents the lower and higher bounds of five mitigation scenarios analyzed by the IPCC – two stringent scenarios, two intermediate scenarios, and a worst-case scenario. Temperatures in California are projected to increase 2.7°F above 2000 averages by 2050 and, depending on global emission levels, 4.1–8.6°F by 2100 (Moser et al. 2012:2).

Physical conditions beyond average temperatures could be indirectly affected by the accumulation of GHG emissions. For example, changes in weather patterns resulting from increases in global average temperature are expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Based upon historical data and modeling, California Department of Water Resources (DWR) projects that the Sierra snowpack will experience a 25 to 40 percent reduction from its historic average by 2050 (DWR 2008:4). 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 Sierra Nevada until spring could flow into the Central Valley concurrently with winter storm events (Moser et al. 2012:5). This scenario would place more pressure on California's levee/flood control system.

Another outcome of global climate change is sea level rise. Sea level rose approximately 7 inches during the last century. The National Research Council (NRC), in their 2012 report on *Sea-Level Rise for the Coasts of California, Oregon, and Washington* projects that the sea level along the California coastline will change between -1 inch (fall) to 24 inches (rise) between 2000 and 2050 and 4 to 66 inches (rise)

between 2000 and the end of this century. This projection is based on projected future ice loss at the poles, steric and ocean dynamics, seismic trends affecting land subsidence, and other numerical models and extrapolations, accounting for increasing levels of uncertainty in future years (NRC 2012:6).

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 (Moser et al. 2012:11, 12).

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 large wildfires (Moser et al. 2012:11).

4.6.3 Regulatory Setting

Greenhouse gas 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

Supreme Court Ruling of Carbon Dioxide as a Pollutant

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for implementing the federal Clean Air Act (CAA) and its amendments. The Supreme Court of the United States ruled on April 2, 2007 that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. The ruling in this case resulted in EPA taking steps to regulate GHG emissions and lent support for state and local agencies' efforts to reduce GHG emissions.

Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks and Corporate Average Fuel Economy Standards

In October 2012, EPA and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 FR 62624). NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. 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 would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630).

In January 2017, EPA Administrator Gina McCarthy signed her determination to maintain the current GHG emissions standards for model year 2022-2025 vehicles. However, on March 15, 2017, the new EPA Administrator, Scott Pruitt, and Department of Transportation Secretary Elaine Chao announced that EPA intends to reconsider the final determination. EPA intends to make a new Final Determination regarding the appropriateness of the standards no later than April 1, 2018 (EPA 2017).

STATE

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, statewide emissions are to be reduced to 2000 levels by 2010, 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

This executive order was the subject of a California Appellate Court decision, *Cleveland National Forest Foundation v. San Diego Association of Governments* (SANDAG) (November 24, 2014) 231 Cal.App.4th 1056, which was reviewed by the California Supreme Court in January 2017. The Supreme Court decided a singular question in the case, which was released on July 13, 2017. The California Supreme Court ruled that SANDAG did not abuse its discretion by declining "to adopt the 2050 goal as a measure of significance in light of the fact that the Executive Order does not specify any plan or implementation measures to achieve its goal."

In addition to concluding that an EIR need not use this executive order's goal for determining significance, the Court described several principles relevant to CEQA review of GHG impacts, including: (1) EIRs should "reasonably evaluate" the "long-range GHG emission impacts for the year 2050;" (2) the 2050 target is "grounded in sound science" in that it is "based on the scientifically supported level of emissions reduction needed to avoid significant disruption of the climate;" (3) in the case of the SANDAG plan, the increase in long-range GHG emissions by 2050, which would be substantially greater than 2010 levels, was appropriately determined to be significant and unavoidable; (4) the reasoning that a project's role in achieving a long-range emission reduction target is "likely small" is not valid for rejecting a target; and (5) "as more and better data become available," analysis of proposed plan impacts will likely improve, such that "CEQA analysis stays in step with evolving scientific knowledge and state regulatory schemes." The Court also ruled that "an EIR's designation of a particular adverse environmental effect as 'significant' does not excuse the EIR's failure to reasonably describe the nature and magnitude of the adverse effect." The Court also recognized that the 40 percent reduction in 1990 GHG levels by 2030 is "widely acknowledged" as a "necessary interim target to ensure that California meets its longer-range goal of reducing greenhouse gas emission 80 percent below 1990 levels by the year 2050." Senate Bill (SB) 32 has since defined the 2030 goal in statute (discussed below).

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 sets the next interim step in the State's continuing efforts to pursue the long-term target expressed under Executive Order S-3-05 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°C, the warming threshold at which major climate disruptions are projected, such as super droughts and rising sea levels.

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 continue 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 Update

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 CO_2-equivalent (CO_2e) emissions, or approximately 21.7 percent from the state's projected 2020 emission level of 545 MMT CO_2e under a business-as-usual scenario (this is a reduction of 47 MMT CO_2e, or almost 10 percent, from 2008 emissions).

In 2014, CARB adopted the *First Update to the Climate Change Scoping Plan* to identify the next steps in reaching AB 32 goals and evaluate the 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 emission sectors (e.g., transportation, building energy, agriculture). After releasing multiple versions of proposed updates in 2017 CARB adopted the next version titled *California's 2017 Climate Change Scoping Plan* (2017 Scoping Plan) in December of that same year (CARB 2017). The 2017 Scoping Plan indicates that California is on track to achieve the 2020 statewide GHG target mandated by AB 32 of 2006 (CARB 2017:9). It also lays out the framework for achieving the mandate of SB 32 of 2016 to reduce statewide GHG emissions to at least 40 percent below 1990 levels by the end of 2030 (CARB 2017).

The 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 an appropriate 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 zero and that an increase in GHG emissions attributable to a project may not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change. In terms of current project-level thresholds, the Placer County Air Pollution Control District (PCAPCD) has developed an evidenced-based, bright-line numeric threshold consistent with the state's long-term 2030 GHG goal.

Senate Bill 32/Assembly Bill 197 (Statutes 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 CARB 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.

Senate Bill 375 (Statutes of 2008)

SB 375, signed by the Governor in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets for cars and light duty trucks, 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 applicable MPO in the project region is the Sacramento Area Council of Governments (SACOG), which includes Placer County except for of the Lake Tahoe Basin. SACOG adopted its first SCS in 2012, which was subsequently updated and adopted in 2016 (SACOG 2016). SACOG was tasked by CARB to achieve a 9 percent per capita reduction by 2020 and a 16 percent per capita reduction by 2035, which CARB confirmed the region would achieve by implementing its SCS (CARB 2013).

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 regulatory standards for vehicle model years 2017 through 2025. The new regulations 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 2016).

Senate Bill 97

The Senate Bill 97 (Statutes of 2007) (SB 97) directed the California Natural Resources Agency to adopt amendments to the CEQA Guidelines to specifically address GHG emissions. The Amendments became effective on March 18, 2010. This EIR complies with these Amendments and the CEQA checklist questions added to Appendix G of the CEQA Guidelines in response to SB 97 are discussed under the Significance Criteria heading below.

LOCAL

Placer County Air Pollution Control District

In October 2016, PCAPCD adopted new significance thresholds for GHG emissions in October 2016. These thresholds are included PCAPCD's updated 2017 CEQA Air Quality Handbook (August, 2017). The District's CEQA Air Quality Handbook outlines expectations and methodologies for the analysis of GHG emissions generated by a proposed project, and guidance on determining the significance of impacts and appropriate mitigation. PCAPCD recommends that both construction and operations-related GHG emissions be quantified for a proposed project, and that the significance of GHG emissions be determined in a manner based on whether such emissions are cumulatively considerable.

City of Roseville General Plan 2035

The City of Roseville General Plan 2035 contains a number of goals and policies applicable to the proposed project that address air quality and climate change. Key provisions from the Air Quality and Climate Change Element are summarized below. Numerous other General Plan elements also address sustainability and the reduction of GHG emissions, including the Circulation Element, Land Use Element, and Public Facilities Element.

Air Quality and Climate Change Element Goals

GOAL 3: Encourage the coordination and integration of all forms of public transport while reducing motor vehicle emissions through a decrease in the average daily trips and vehicle miles traveled and by increasing the commute vehicle occupancy rate by 50 percent to 1.5 or more persons per vehicle.

GOAL 4: Increase the capacity of the transportation system, including the roadway system and alternate modes of transportation.

GOAL 5: Provide adequate pedestrian and bikeway facilities for present and future transportation needs.

GOAL 7: While recognizing that the automobile is the primary form of transportation, the City of Roseville should make a commitment to shift from the automobile to other modes of transportation.

Air Quality and Climate Change Element Transportation and Circulation-Related Policies

- **Policy 6.** Develop consistent and accurate procedures for mitigating transportation emissions from new and existing projects.
- **Policy 7.** Encourage alternative modes of transportation including pedestrian, bicycle, and transit usage.
- **Policy 10.** Conserve energy and reduce air emissions by encouraging energy efficient building designs and transportation systems.

Air Quality and Climate Change Element Implementation Measures

6. Mitigation Strategies – Motor Vehicles

- Develop mitigation strategies to reduce air emissions from motor vehicles. These strategies, which may consist of improvements and refinements to the transportation and circulation infrastructure, may include:
  - Maintaining acceptable levels of service as specified in the Circulation Element;
  - Minimizing the number of intersections along major arterials;
  - Requiring traffic counter loops and traffic management hardware at major garage entrances, driveways, new intersections, and other appropriate locations;
  - Synchronizing traffic signals on arterial streets to the extent possible to facilitate the flow of traffic and minimize stops or delays;
  - Considering high occupancy vehicle lanes in street and highway widening and new construction projects for arterials and wider rights-of-way; and
  - Filling gaps or missing links in infrastructure systems (i.e., bike/pedestrian trails, bridge crossings, railroad crossings, street extensions) prior to the construction and occupancy of residential developments utilizing that infrastructure.

- Develop strategies to minimize the number and length of vehicle trips, which may include:
  - Promoting commercial/industrial project proponent sponsorship of van pools or club buses;
  - Encouraging commercial/industrial project day care and employee services at the employment site;
  - Encouraging the provision of transit, especially for employment-intensive uses of 200 or more employees;
  - Providing subscription bus service to major trip generators or events;
  - Discouraging single-occupant vehicle trips through parking supply and pricing controls or other measures identified by the PCAPCD;
  - Providing incentives for the use of transportation alternatives;
  - Providing expansion and improvement of public transportation services and facilities;
  - Encouraging public transit use and the formation of car pools in new areas by requiring bus turnouts, bus shelters, and/or park-and-ride lots;
  - Locating public facilities in areas easily served by public transportation; and

- Requiring that large developments (e.g. Specific plans, large commercial or residential uses) dedicate land for use as park-and-ride lots if suitably located, or requiring large developments to provide park-and-ride spaces if located adjacent to regional transit facilities.

7. Mitigation Strategies – Motor Vehicle Alternatives

- Encourage transportation alternatives to motor vehicles by developing infrastructure amenable to such alternatives by doing the following:
  - Implement the Bicycle Master Plan and Long-Range Transit Plan as specified in the Circulation Element;
  - Consider right-of-way requirements for bike usage in the planning of new arterial and collector streets and in street improvement projects;
  - Require that new development be designed to promote pedestrian and bicycle access and circulation;
  - Provide safe and secure bicycle parking facilities at major activity centers, such as public facilities, employment sites, and shopping and office centers;
  - Provide convenient and safe pedestrian and bike movement through the large parking areas that surround large retail and office centers;
  - Provide safe pathways that link residential areas to schools, parks, services, and employment areas and transit facilities;
  - Promote project design that encourages pedestrian and cyclist use, including grade separated crossing at major arterials, clear and safe connections between projects and uses;
  - Install sidewalks in residential and commercial developments with protective curbing and adequate lighting and pedestrian amenities.

City of Roseville Communitywide Sustainability Action Plan

The Roseville Communitywide Sustainability Action Plan (SAP) sets forth a comprehensive strategy to reduce GHG emissions, as well as to promote economic growth based on clean technology and sustainable practices (City of Roseville 2010). While the 2035 General Plan includes goals and policies that guide the City's approach to addressing sustainability and climate change, the SAP serves as a more detailed strategy to implement the City's sustainability and climate change policies.

As noted earlier in this section, the SAP contains the City's GHG emissions baseline inventory. The SAP also sets a GHG emissions reduction target of reducing emissions from the baseline level of 7.5 MT CO_2e per service population to 6.0 MT CO_2e per service population by 2020.

The SAP contains five sustainable action strategies, with specific measures under each designed to achieve the City's goals and targets. The actions include bike and pedestrian enhancements in the Transportation Strategy. The actions are summarized below in Table 4.6-1.

The City plans to complete a qualified communitywide climate action plan by late 2018 (City of Roseville 2017).

Table 4.6-1 Roseville Sustainability Action Plan Strategies and GHG Emission Reductions

Sustainable Action Strategy	Summary of Measures	Total Estimated GHG Emission Reductions (MT CO_2e)	Percent of Total GHG Reductions Required to Meet Target
Transportation	Rideshare and Carpooling Transit Expansion Bike and Pedestrian Enhancements Alternative Fuel Infrastructure Intelligent Transportation Systems	49,130	66%
Land Use and Green Building	Urban Forestry Numerous supporting measures related to alternative transportation modes	1,580	2%
Energy	Retrofits of Existing Residential Buildings Retrofits of Existing Commercial Buildings New Residential Building Energy Efficiency New Commercial Building Energy Efficiency	19,460	26%
Solid Waste	Food Waste to Energy	1,090	1%
Water	Reduce Water Use 20% Per Capita	3,520	5%
Marketing and Education	Community-Based Social Marketing Promote sustainable lifestyles	NA	NA
Total		74,060	100%

Notes: Totals may not sum due to rounding

GHG = greenhouse gas; MT = metric tons, CO_2e = carbon dioxide equivalent. Totals may not be exact due to rounding.

Source: City of Roseville 2010; adapted and compiled by Ascent in 2017.

City of Roseville Municipal Climate Action Plan

The Roseville City Council adopted a Municipal Climate Action Plan (CAP) in 2009. The plan addressed GHG emission reductions from City facilities and operations, including buildings, vehicle fleets, treatment plants, and other infrastructure. The CAP established a baseline municipal emissions inventory of 28,858 MT CO_2e for the year 2006. The City Council approved a GHG reduction goal of 22.8 percent by 2035 through a variety of measures applicable to these sources (City of Roseville 2009). The Communitywide SAP described above is designed to complement the strategies contained in the Municipal CAP.

4.6.4 Impacts

METHODS OF ANALYSIS

Short-term construction-generated GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.1 computer program (South Coast Air Quality Management District 2016), as recommended by PCAPCD and other air districts in California. Modeling was based on project-specific information (e.g., size, amounts of demolition, area to be graded, area to be paved), where available; reasonable assumptions based on typical construction activities; and default values in CalEEMod that are based on the project's location.

Construction-related activities that would generate GHGs include worker commute trips, haul trucks carrying supplies and materials to and from the project site, and off-road construction equipment (e.g., dozers, loaders, excavators). Because the proposed project would be constructed in four segments,

annual construction emissions were modeled for each segment and phase separately, according to construction phasing and equipment anticipated for each segment.

The proposed project would include use of a multi-use trail by bicyclists and pedestrians and routine maintenance activities. Accordingly, no increases in motor vehicle trips and associated tailpipe emissions by users would be generated by the project, and maintenance-related emissions would be minimal. Similarly, no new buildings would be constructed or operated as part of the proposed project. Thus, calculations of operation-related GHG emissions are not needed. Operation-related GHG emissions, apart from the loss in carbon sequestration potential discussed below, are addressed qualitatively in the impact analysis.

The project also would involve the net removal of up to 0.7 acre of riparian forest and up to 4.3 acres of valley oak riparian woodland over the course of the project's four-year construction period. The net carbon sequestration losses from the net reduction in vegetation was estimated using CalEEMod's sequestration module. CalEEMod uses a separate set of land use types and units to estimate emissions from loss of stored carbon than to estimate emissions from lost sequestration potential. To estimate emissions from the loss of stored carbon, CalEEMod bases the calculation of a set of land use types (e.g., scrub, trees, cropland, grassland, wetland) and uses per-acre emissions factors. To estimate emissions from the loss of sequestration potential, CalEEMod bases the calculation on a set of tree types either lost or planted (e.g., mixed hardwood, juniper, cedar/larch, miscellaneous) and uses annual per-tree emission factors. Due to the variety of tree species that inhabit the project area, the "trees" land use category and the "miscellaneous" tree category in CalEEMod are assumed to best reflect both riparian forest and valley oak riparian woodland. CalEEMod assumes the "tree" land use type would store 111 MT CO_2/acre and "miscellaneous" tree types would sequester 0.0354 MT CO_2 per tree per year. Based on a general review of the project map, there are approximately 15 trees per acre within the project boundary. See Tables 11.11 and 11.2 of Appendix D of the CalEEMod Version 2016.3.1 for a list of the carbon loss and sequestration factors.

The loss of stored carbon in the removed vegetation is conservatively assumed to be completely returned to the atmosphere as CO_2, such as through burning, and these emissions are counted toward the project's construction emissions. This is a conservative approach to avoid the risk of understating an impact; it may come to pass that not all the carbon is returned to the atmosphere, if some of the wood is repurposed, rather than burned (such as for chipping and mulch). The resulting annual loss in carbon sequestration potential is counted toward the project's operational emissions. Due to the approximate nature of the carbon sequestration factors used above, the carbon losses estimated here are assumed to apply to all vegetation types within riparian forest and valley oak riparian woodland removed by the project. Also, the loss of stored carbon over the four-year construction period is assumed to be proportional to the construction activity in each year.

THRESHOLDS OF SIGNIFICANCE

Appendix G of the State CEQA Guidelines indicates that a proposed project would result in a potentially significant impact on climate change if it 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 October 2016, PCAPCD adopted new CEQA thresholds of significance for evaluating whether the GHG emissions of different types of projects would be a cumulatively considerable contribution to climate change. These new thresholds are supported by PCAPCD's California Environmental Quality Act Thresholds of Significance Justification Report released in October 2016 and are included in the

PCAPCD's draft 2017 Handbook (PCAPCD 2016, 2017). PCAPCD's proposed GHG thresholds more accurately reflect the historical CEQA projects reviewed by PCAPCD over the last thirteen years (2003-2015) and the CEQA significance thresholds adopted by other air districts in the Sacramento Area (PCAPCD 2016:5). PCAPCD recommends an array of GHG thresholds for determining whether a project's GHG emissions would be cumulatively considerable. More specifically, PCAPCD's recommendations include:

- a "floor" mass emission threshold of 1,100 MT CO_2e/year, which, if not exceeded, means the project's GHGs would be less than cumulatively considerable (regardless of the project's GHG efficiency);
- a "bright-line cap" mass emission threshold of 10,000 MT CO2e/year levels, which, if exceeded, means the project's GHGs would be cumulatively considerable regardless of the project's GHG efficiency; and
- GHG efficiency-based thresholds for land use development projects, depending on whether the project is rural or urban and residential or non-residential (e.g., 4.5 MT CO_2e/year per capita and 26.5 MT CO_2e/year/1,000 square feet for residential and non-residential land uses in urban areas, respectively) (PCAPCD 2016:E-2).

With respect to construction-related emissions PCAPCD, considers a "bright-line cap" of 10,000 MT CO_2e for determining the level of significance for land use construction phases (PCAPCD 2016:22).

For this particular project, the City evaluates the net change in GHGs resulting from the project in light of the "floor" mass emission thresholds being proposed by PCAPCD. This is because per-capita and per-square footage efficiency metrics are not suitable for recreational sites that provide neither employment nor housing.

ISSUES OR POTENTIAL IMPACTS NOT DISCUSSED FURTHER

The analysis in this section focuses on both construction-related and operational GHG emissions. There are no issues or potential impacts that were considered and dismissed from further evaluation.

IMPACT ANALYSIS

Impact 4.6-1	Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.
Applicable Policies and Regulations	Assembly Bill 32 (2006), Senate Bill 32 (2016) City of Roseville General Plan 2025, Sustainability Action Plan
Significance with Policies and Regulations	Proposed Project: Less than significant Alignment Option 1A: Less than significant Alignment Option 1C: Less than significant Alignment Option 5A: Less than significant
Mitigation Measures	None required (Proposed Project, Option 1A, Option 1C, Option 5A)
Significance after Mitigation	Less than significant (Proposed Project, Option 1A, Option 1C, Option 5A)

Proposed Trail Alignment

Construction Impacts

Construction-related activities that would generate GHGs include worker commute trips, haul trucks carrying supplies and materials to and from the project site, off-road construction equipment (e.g., dozers, loaders, excavators), and loss of carbon storage and sequestration potential.

Appendix E contains model input and output parameters, detailed assumptions, and annual construction emissions estimates, expressed in MT CO_2e/year. Construction emissions are summarized in Table 4.6-2. Based on the modeling, which assumes Segments A, B, and C would be constructed together within the same years (2021 and 2022), construction of the proposed project would result in maximum annual GHG emissions of approximately 406 MT CO_2e within the first year of construction, with lesser amounts in subsequent years. The maximum annual GHG emissions during construction would be below the 10,000 MT CO_2e/year mass emissions threshold of significance for construction activities. Thus, short-term construction-generated GHG emissions would not be cumulatively considerable.

Table 4.6-2 Summary of Maximum Annual GHG Emissions Associated with Project Construction Activities[1]

	2021 GHG Emissions (MT CO_2e/year)	2022 GHG Emissions (MT CO_2e/year)	2023 GHG Emissions (MT CO_2e/year)	2024 GHG Emissions (MT CO_2e/year)
Segment A: Darling Way – Eastwood Park	279	272	-	-
Segment B: Eastwood Park – Oak Ridge Drive	101	60	-	-
Segment C: Eich School – Rocky Ridge Dr	27	73	-	-
Segment D: Rocky Ridge Dr – Spahn Ranch Rd	-	-	228	145
Total Construction Activity Emissions (MT CO_2e/yr)	406	404	228	145
Total Emissions from Lost Carbon Storage from Permanent Vegetation Removal (MT CO_2/yr)	189	188	106	67
Total Maximum Annual Emissions (MT CO_2e/yr)	**594**	**592**	**334**	**212**
PCAPCD Construction Threshold of Significance (MT CO_2e/yr)	10,000	10,000	10,000	10,000

Notes: Totals may not sum due to rounding.

GHG = greenhouse gas emissions

MT CO_2e/year = metric tons of carbon dioxide-equivalent per year

PCAPCD = Placer County Air Pollution Control District

[1] Modeled values represent maximum annual GHG emissions that could occur in each year during all phases of construction for each segment of the proposed project. See Appendix E for detail on model inputs, assumptions, and project specific modeling parameters.

Source: CalEEMod 2016.3.1.; modeling conducted by Ascent Environmental in 2017

Use-related Impacts

The proposed project would include use of a multi-use trail by pedestrians and bicyclists and occasional routine maintenance. Accordingly, no substantial increases in motor vehicle trips and associated tailpipe emissions would be generated by the use and maintenance of the project. Similarly, no new buildings would be constructed and operated as part of the proposed project. The project would include a limited number of new outdoor lighting fixtures along some portions of the trail, such as along undercrossings and underneath or on bridges; however, energy consumption and GHG emissions associated with this lighting would be minimal. Occasional future trail maintenance activities could require the use of motor vehicles or motorized equipment related to landscaping or pavement repairs; however, the scope or frequency of such activities would be minor, short-term, and infrequent in nature and would result in minimal annual GHG emissions.

Loss of carbon sequestration potential from permanent removal of vegetation would result in approximately 2.6 MT CO_2 "emitted" per year, which is below PCAPCD's "floor" emissions threshold of 1,100 MT CO_2e/year.

Use of the multi-use trail project would be consistent with adopted policies and implementation measures in the City of Roseville General Plan and SAP (see Regulatory Setting above) designed to reduce GHG emissions from mobile sources, which is the largest existing and projected future source of GHG emissions within both the City and region. Key policies and measures include:

- expanding the capacity of the system for alternate modes (General Plan, Air Quality and Climate Change Goal 4);
- providing adequate pedestrian and bikeway facilities for present and future transportation needs (General Plan, Air Quality and Climate Change Goal 5);
- encouraging alternative modes of transportation including pedestrian, bicycle, and transit usage (General Plan, Air Quality and Climate Change Policy 7);
- implementing the Bicycle Master Plan and Long-Range Transit Plan as specified in the Circulation Element (General Plan, Air Quality and Climate Change Element Implementation Measures, 7. Mitigation Strategies – Motor Vehicle Alternatives);
- providing safe pathways that link residential areas to schools, parks, services, and employment areas and transit facilities (General Plan, Air Quality and Climate Change Element Implementation Measures, 7. Mitigation Strategies – Motor Vehicle Alternatives); and
- various bike and pedestrian measures contained in the City's SAP.

While it cannot be known with certainty how many motor vehicle trips or vehicle miles traveled (VMT) could be reduced by increased use of the proposed trail by bicyclists and pedestrians (in lieu of vehicle trips), over the long term it is expected that trail use would contribute to decreased motor vehicle travel, which would help achieve operational GHG emissions reductions identified in the adopted plans and measures designed to achieve communitywide GHG emissions reductions. These reductions would likely offset or exceed any potential increases in GHG emissions associated with energy consumed by new lighting or mobile-source emissions from trail maintenance activities, because energy-efficient lighting consumes minimal electricity and maintenance would be a minor, infrequent, and short-term activity in each instance. Additionally, the loss of carbon sequestration from permanently removed vegetation would be less than 3 MT CO_2e/year. As a result, increases in GHG emissions associated use of the proposed project would not exceed the "floor" mass emissions threshold of 1,100 MT CO_2e/year.

Conclusion

Both construction-related and operational GHG emissions associated with the proposed project would not generate GHG emissions, directly or indirectly, that would have a significant effect on the environment, and the proposed project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs. It is reasonably foreseeable that a net GHG benefit could accrue over the long term to the extent that bicycle or pedestrian travel occurs on the proposed trail in lieu of motor vehicle trips. Such a benefit would be consistent with the mobility enhancement goal of the proposed project. It is not feasible to precisely quantify the number of motor vehicle trips avoided, so a beneficial impact conclusion would not be a certainty. Consequently, for CEQA compliance purposes, this impact would be noted as **less than significant**.

Alignment Option 1A

Both construction and operational activities for Option 1A would be the same type and general magnitude of activities that would occur under the Proposed Trail Alignment. The total number of bridges constructed under Option 1A would be less than the number of bridges constructed under the Proposed Trail Alignment, which would result in fewer GHG emissions associated with bridge construction activities. Option 1A would require an additional 765 linear feet of retaining walls or streambank stabilization when compared to the Proposed Trail Alignment. However, construction

emissions would be less than under the Proposed Trail Alignment, because emissions from the lighter type of equipment needed to construct these elements would be less than emissions for the heavy construction equipment needed for bridge construction. Additionally, the area of permanent vegetation removed would be less under Option 1A than the Proposed Trail Alignment. Thus, construction and operational activities under Option 1A would be less than estimated emissions for the Proposed Trail Alignment and would not exceed PCAPCD's recommended "floor" mass emissions thresholds. Therefore, project construction or use under this option would not generate GHG emissions, directly or indirectly, that would have a significant effect on the environment; and, the proposed project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs. This impact would be **less than significant**.

Alignment Option 1C

Both construction and operational activities for Option 1C would be the same type and general magnitude of activities that would occur under the Proposed Trail Alignment. Option 1C would not require the widening of the Darling Way bridge, which would result in fewer emissions associated with bridge construction activities. Construction and operational activities under Option 1C would be less than estimated emissions for the Proposed Trail Alignment. The area of permanent vegetation removed would be slightly higher than the Proposed Trail Alignment, but still below PCAPCD's "floor" emissions threshold of 1,100 MT CO_2e/year. Thus, implementation of Option 1C would not exceed PCAPCD's recommended "floor" mass emissions thresholds. Therefore, project construction or use under this option would not generate GHG emissions, directly or indirectly, that would have a significant effect on the environment; and, the proposed project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs. This impact would be **less than significant**.

Alignment Option 5A

Both construction and operational activities for Option 5A would be the same type and general magnitude of activities that would occur under the Proposed Trail Alignment. Implementing Option 5A would change the location of one bridge (#14 rather than #13), but would not change the number of bridges proposed, which would result in the same emissions associated with bridge construction activities. Construction and operational activities under Option 5A would be the same as estimated emissions for the Proposed Trail Alignment. The area of permanent vegetation removed would be slightly higher than the Proposed Trail Alignment, but still below PCAPCD's "floor" emissions threshold of 1,100 MT CO_2e/year. Thus, implementation of Option 5A would not exceed PCAPCD's recommended "floor" mass emissions thresholds. Therefore, project construction or use under this option would not generate GHG emissions, directly or indirectly, that would have a significant effect on the environment; and, would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs. This impact would be **less than significant**.

Mitigation Measures

None required.