CHAPTER 8 CLIMATE CHANGE

8.1 INTRODUCTION

The proposed Fiddyment Ranch Specific Plan Amendment 3 project would amend the existing West Roseville Specific Plan (WRSP) by changing the land use and zoning designations for some parcels and by changing development densities within the project area. The project would result in the development of 1,905 additional residential units and 7.27 additional acres of commercial land uses compared with the development evaluated in the WRSP EIR. Other changes proposed to the land uses within the Fiddyment Ranch project area include minor adjustments in acreage for parks, open space, public/quasi-public, and roadway rights-of-way. The WRSP EIR did not include any analysis of climate change impacts and greenhouse gas emissions. This Draft Subsequent EIR chapter evaluates the climate change impacts from all development within the Fiddyment Ranch parcels that would be affected by the proposed Specific Plan amendment – a total of 4,716 residential units and 7.27 acres of community commercial land uses.

This chapter includes a description of existing climate change and greenhouse gas conditions, a summary of applicable regulations, and analyses of the project's potential to contribute to climate change impacts and the potential effects of climate change on the proposed project. Referenced materials include:

- *Air Quality Analysis*, Shaw Environmental, 2011
- *City of Roseville General Plan*, 2010 as amended
- *Creekview Specific Plan FEIR,* 2011
- *West Roseville Specific Plan*, 2004, as amended 2010

The Air Quality Impact Analysis for the proposed project is provided in Appendix D. The other documents listed above are available for review during normal business hours at:

City of Roseville Permit Center
311 Vernon Center
Roseville, California

The Notice of Preparation (NOP) for this EIR, the Initial Study, and comments received in response to the NOP are provided in Appendix A. No comments were received related to climate change.

8.2 ENVIRONMENTAL SETTING

Greenhouse Gases and the Greenhouse Effect

Greenhouse gases (GHG) are gases that trap heat in the atmosphere, which regulates the earth's temperature. The presence and effect of natural GHGs is critical to the ability of the earth to support life. Specifically, GHGs create a "greenhouse effect" in the earth's atmosphere. When solar radiation enters the atmosphere from space, some is absorbed by the earth's surface and some is reflected back to space as infrared radiation. Some of that infrared radiation is absorbed by GHGs, trapping that energy and warming the atmosphere.

As defined in California's Global Warming Solutions Act of 2006, (also referred to as Assembly Bill 32) GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). Each of these gases has a different "Global Warming Potential," which refers to the rate at which each gas contributes to global climate changes. The Global Warming Potential (GWP) of each gas is affected by its physical properties and atmospheric lifetime. For ease of reference and analysis, carbon dioxide is widely used as the reference point, and emissions of other GHGs are converted into carbon dioxide equivalents (CO2e). Large emission sources are reported in million metric tons of CO2e. (In the U.S., a ton is equal to 2,000 pounds; this is known as a short ton. A metric ton is equal to 2,204.6 pounds.)

GHGs are emitted by both natural processes and human activities. Human activities have exerted a growing influence on some of the key factors that govern climate by changing the composition of the atmosphere and by modifying vegetation. The concentration of carbon dioxide in the atmosphere has increased from the burning of coal, oil, and natural gas for energy production and transportation and the removal of forests and woodlands around the world to provide space for agriculture and other human activities. Emissions of other GHGs, such as methane and nitrous oxide, have also increased due to human activities. These activities have elevated the concentration of GHGs in the atmosphere beyond naturally occurring concentrations and the increase in atmospheric concentrations of GHGs has resulted in more heat being held within the atmosphere. This has led to some changes in global climate patterns and these changes are expected to increase over time as GHG concentrations rise.

Greenhouse Gas Emissions in California

On a per-person basis, greenhouse gas emissions are lower in California than most other states; however, California is a populous state and the second largest emitter of GHGs in the United States and one of the largest emitters in the world. According to the California Energy Commission, California produces roughly 1.4 percent of global GHG emissions and 6.2 percent of the total U.S. GHG emissions.

In 2004, California generated 524 million metric tons of GHG measured as CO2e emissions (California Air Resources Board 2007). Transportation is the largest source of greenhouse gas emissions in California, followed by industrial sources and electric power generation. Specifically, transportation generates 41 percent of California's GHG emissions, followed by the industrial sector (23 percent), electricity generation (20 percent), agriculture and forestry (8 percent), and other sources (8 percent). Emissions of CO_2 and N_2O are byproducts of fossil fuel combustion, among other sources. Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2 include uptake by vegetation and dissolution into the ocean.

Climate Model Predictions

Almost all climate scenarios include a continuing trend of warming through the end of the century given the vast amounts of GHGs already released, and the difficulties associated with reducing emissions to a level that would stabilize the climate. In addition to increases in average temperatures, global climate changes include changes in precipitation and wind patterns and could lead to environmental impacts in a wide variety of areas, including: reduced snowpack resulting in changes to water supplies, increased risk of wildfires, changing

conditions for farming and ranching operations, and public health hazards associated with higher peak temperatures, heat waves, and decreased air quality.

Some climate models indicate that if GHG emissions continue to proceed at a medium or high rate, temperatures in California are expected to increase by 4.7 to 10.5 degrees Fahrenheit (°F) by the end of the century. Lower emission rates would reduce the projected warming to between 3 and 5.6 °F.

Other climate predictions have been made by the Intergovernmental Panel on Climate Change (IPCC). The IPCC was established by the World Meteorological Organization and United Nations Environment Programme. IPCC's mission is to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, including the potential impacts and options for adaptation and mitigation. IPCC predicts substantial increases in global temperatures of between 2 and 11.5 °F by the end of the century under six different scenarios of emissions and carbon dioxide equivalent concentrations (IPCC 2007). Sea levels are predicted to rise by 0.18 to 0.59 meters (7 to 23 inches) during this time, with an additional 3.9 to 7.8 inches possible depending upon the rate of polar ice sheets melting from increased warming. The IPCC report also states that the increase in hurricane and tropical cyclone strength since 1970 can likely be attributed to human-generated greenhouse cases.

Effects of Global Climate Change

California's Climate Action Team was established in 2005 to coordinate statewide efforts to identify and implement strategies to reduce GHG emissions in the state. The Climate Action Team reports regularly to the Governor and the Legislature. The 2006 Climate Action Team Report indicated that the following climate change effects and conditions can be expected in California over the course of the next century:

- Increasing temperatures (rising between 2 and 11.5 °F by the end of the century), leading to substantial increases in the number of days ozone pollution levels are exceeded in most urban areas;
- Extreme heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- An increase in heat-related human deaths and infectious diseases and a higher risk of respiratory problems caused by deteriorating air quality;
- A diminishing Sierra snowpack declining by 70 percent to 90 percent, threatening the state's water supply;
- Potential increase in the severity of winter storms, affecting peak stream flows and flooding;
- Coastal erosion along the length of California and sea water intrusion into the Sacramento River Delta ranging from a 4- to 33-inch rise in sea level. This would exacerbate flooding in already vulnerable regions;
- Increased vulnerability of forests due to pest infestation and increased temperatures;

- Changes in distribution of plant and wildlife species due to changes in temperature, competition of colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate changes;
- Increased challenges for the state's important agricultural industry from water shortages, increasing temperatures, and saltwater intrusion into the Delta;
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield; and
- Increased electricity demand, particularly in the hot summer months.

8.3 REGULATORY SETTING

Federal Regulations

There are currently no federal laws that regulate climate change or GHG emissions through the establishment of emissions limitations or regulatory thresholds. The Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007 both include provisions that may help reduce GHG emissions, but neither have a direct effect on analysis of the proposed project's GHG emissions, contribution to climate change effects, and exposure to the effects of climate change.

The Energy Policy Act of 2005 establishes a national program designed to encourage voluntary reductions in greenhouse gases and a Renewable Fuel Standard requires a minimum amount of renewable fuels be blended into transportation fuels each year. The Energy Independence and Security Act of 2007 strengthens the Renewable Fuel Standard by increasing the minimum level of renewable fuels and by setting maximum carbon content limits for renewable fuels. The Energy Independence and Security Act of 2007 also:

- Addresses research, development, and demonstration of technologies to capture and store carbon dioxide;
- Requires the Department of Transportation to research reducing transportation-related energy use, mitigating the causes of climate change, and addressing the impacts of climate change on transportation; and
- Sets more stringent fuel economy standards for passenger cars and light trucks, higher efficiency standards for appliances and lighting, and higher efficiency requirements for government buildings.

State Regulations

State of California Executive Order S-3-05

In June 2005, the Governor of California signed Executive Order S-3-05 which identified the California Environmental Protection Agency (Cal/EPA) as the lead coordinating State agency for establishing climate change emission reduction targets in California. This order sets the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels. Under this order, several state agencies cooperatively prepared a Climate Action Plan, which identifies strategies to reduce GHG emissions. This order also established the state's Climate Action Team, which coordinates statewide efforts to implement the Climate

Action Plan strategies and reports regularly to the Governor and the Legislature regarding progress made towards achieving the GHG emission reduction targets set by this order.

The California Global Warming Solutions Act of 2006 (Assembly Bill 32)

In the fall of 2006, the Global Warming Solutions Act (AB 32) was signed into law. This act defines the six GHGs identified in Section 8.2 above and established the Executive Order S-3-05 GHG emission reduction target for 2020 as a matter of law. Specifically, AB 32 requires that the State reduce GHG emissions in 2020 to 1990 levels. To accomplish this, AB 32 required the California Air Resources Board (CARB) to

- Adopt Early Action Measures to reduce GHGs;
- Establish a statewide GHG emissions cap for 2020 based on 1990 emissions;
- Adopt mandatory reporting rules for significant GHG sources;
- Adopt a scoping plan indicating how emission reductions will be achieved through regulations, market mechanisms, and other actions; and
- Adopt regulations needed to achieve the maximum technologically feasible and cost-effective reductions in GHGs.

Early Action Measures

ARB has adopted several early action measures to reduce GHG. They include actions such as improvements to landfill methane capture, a vehicle tire pressure program, improvements to heavy duty truck efficiency, and a low carbon fuels standard (LCFS), which requires that all fuels sold in California must have a reduced carbon content that will lower emissions by 10 percent by 2020.

Guidance and protocols for businesses and governments to facilitate GHG emission reductions were approved as early action items by CARB at its June 2007 hearing. A Local Government Toolkit was designed to provide guidance and resources to help cities and counties reduce greenhouse gas emissions and save money. No regulations have been adopted by CARB that apply specifically to cities and counties.

California's Scoping Plan and GHG Emissions Cap

In the adopted Climate Change Scoping Plan (2008), CARB lays out the GHG reductions that need to be achieved and the types of measures that will be used to reach them. The Plan shows that California's 1990 GHG emissions equaled 427 million metric tons CO2e, and predicts that under a "business as usual" scenario, 2020 GHG emissions would equal 596 million metric tons CO2e. Consequently, compared to 1990, emissions would need to be reduced by 169 million metric tons CO2e. This represents a 30 percent GHG reduction to be achieved by 2020.

CARB adopted the Scoping Plan after conducting environmental review of the effects of the plan in a Functionally Equivalent Document to an EIR, as allowed under CEQA Guidelines Article 17 (Sections 15250 to 15253). The Functionally Equivalent Document adopted by CARB was challenged and a court determined it did not meet CEQA requirements for analysis of project alternatives. A Supplement to the AB 32 Scoping Plan Functional Equivalent Document was released by CARB for public review on June 13, 2011.

The Scoping Plan identifies the following categories of measures, in addition to the Early Action Measures previously adopted, to achieve this reduction:

- California Cap-and-Trade Program
- California Light-Duty Vehicle GHG Gas Standards
- Energy Efficiency
- Renewables Portfolio Standard
- Low Carbon Fuel Standard
- Regional Transportation-Related GHG Targets
- Vehicle Efficiency Measures
- Goods Movement
- Million Solar Roofs Program
- Medium/Heavy-Duty Vehicles
- Industrial Emissions
- High Speed Rail
- Green Building Strategy
- High Global Warming Potential Gases
- Recycling and Waste
- Sustainable Forests
- Water
- Agriculture

CARB has initiated development of measures for each of these categories.

Senate Bill 375 - Redesigning Communities to Reduce Greenhouse Gases

SB 375 encourages housing and transportation planning on a regional scale, in a manner designed to reduce vehicle use and associated GHG emissions. It requires CARB to set regional targets for the purpose of reducing greenhouse gas emissions from passenger vehicles for 2020 and 2035. The targets apply to the regions in the State covered by the 18 Metropolitan Planning Organizations (MPOs), including the Sacramento Regional Council of Governments (SACOG) in the Sacramento region. If MPOs do not meet the GHG reduction targets, transportation projects will not be eligible for funding programmed after January 1, 2012. CARB adopted regional reduction targets in 2010. For the SACOG area, the adopted reduction targets call for a 7 percent reduction by 2020 and a 16 percent reduction by 2025.

SB 375 also requires each MPO to include a Sustainable Communities Strategy (SCS) in their Regional Transportation Plan. The SCS must set forth a vision for growth for the region while taking into account transportation, housing, environmental, and economic needs. The SCS will be the blueprint by which the region will meet its GHG emissions reductions target if there is a feasible way to do so.

Prior to enactment of SB 375, SACOG adopted a metropolitan transportation plan (MTP) for 2035 to provide a regional vision for all modes of surface transportation. The MTP uses federal and state funds for programs designed to meet goals such as clean air; for designing communities to encourage local pedestrian, bicycle, and transit travel; and for improvements to main routes that serve longer distance travel around the region. A key component of the existing MTP is the Preferred Blueprint Scenario, which promotes compact, mixed-use development. The City of Roseville adopted Blueprint Implementation strategies that support the Preferred Blueprint Scenario. SACOG is currently updating the MTP and is in the process of drafting the SCS, in compliance with SB 375.

Senate Bill 97 – Modification to the Public Resources Code

On August 24, 2007, Governor Schwarzenegger signed SB 97 which acknowledges that climate change is an important environmental issue that requires analysis under CEQA. This bill required the Office of Planning and Research (OPR) to prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions, including, but not limited to effects associated with transportation or energy consumption. The Resources Agency adopted amendments to the CEQA Guidelines regarding analysis and mitigation of climate change effects in late 2009 and these amendments became effective in early 2010.

California Building Standards Code

One of the measures identified in the CARB Scoping Plan for reducing GHG emissions is a "Green Building Strategy," which the Scoping Plan estimates will result in a reduction of 26 million metric tons of carbon dioxide equivalent (MMTCO2e), relative to business as usual, by 2020.

The California Building Standards Commission adopted the California Green Building Standards Code (CalGreen, Title 24 of the California Code of Regulations) in 2010. CARB has estimated that the mandatory requirements of CalGreen will result in a reduction of 3 MMTCO2e by 2020. This represents approximately 1.8 percent of the total 169 MMTCO2e that the state must reduce by 2020 from a business as usual scenario in order to satisfy AB 32's mandates.

CalGreen applies to many types of residential and non-residential buildings throughout California. It includes mandatory provisions, as well as two tiers of voluntary provisions. Mandatory provisions for both residential and non-residential buildings are divided into five categories: site development; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and environmental quality. The mandatory provisions in each category are similar for residential and non-residential buildings, though the non-residential building requirements tend to include additional specifications and apply to more fixtures and systems. Key provisions of CalGreen include:

- Mandatory 20 percent reduction in indoor water use and voluntary goals for reductions of 30 percent, 35 percent and 40 percent;
- Separate meters must be provided for indoor and outdoor water use at nonresidential buildings; and at those sites, irrigation systems for larger landscaped areas must be moisture-sensing.
- 50 percent of construction waste must be diverted from the landfills; higher, voluntary diversion amounts of 65 percent to 75 percent for new homes, and 80 percent for commercial construction.
- Mandatory inspections of energy systems -- such as the heat furnace, air condition and mechanical equipment -- for nonresidential buildings that are larger than 10,000 square feet to "ensure that all are working at their maximum capacity according to design efficiencies."

- ❖ Paint, carpet, vinyl flooring, particle board and other interior finish materials must be low-emitting in terms of pollutants.

In addition to the new requirements under CalGreen, Part 6 of the California Building Standards Code establishes energy-efficiency requirements for residential and non-residential buildings.

Local Regulations

City of Roseville

The *City of Roseville General Plan* was updated in 2008 to specifically identify policies that reduce greenhouse gas emissions. These policies address global climate change by requiring greenhouse gas emissions reduction, conserving energy and resources, and addressing the potential impact of climate change (e.g., the flood protection policies). The policies applicable to the analysis of the proposed project's GHG emissions, contribution to climate change effects, and exposure to the effects of climate change, are listed here:

Community Form Policy 5: Promote land use patterns that result in the efficient use of urban lands and preservation of open space as specified in the Open Space and Conservation Element.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 1: Promote land use patterns that support a variety of transportation modes and accommodate pedestrian mobility.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 2: Allow for land use patterns and mixed use development that integrate residential and non-residential land uses, such that residents may easily walk or bike to shopping, services, employment, and leisure activities.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 3: Concentrate higher intensity uses and appropriate support uses within close proximity of transit and bikeway corridors as identified in the Bicycle Master Plan. In addition, some component of public use such as parks, plazas, public buildings, community centers and/or libraries should be located within the corridors.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 5: Where feasible, improve existing development areas to create better pedestrian and transit accessibility.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 6: Through City land use planning and development approvals, require that neighborhood serving uses (e.g., neighborhood commercial uses, day care, parks, schools, and other community facilities) be physically linked with adjacent residential neighborhoods.

Community Form - Relationship of New Development - Policy 1: Require that new development areas and associated community-wide facilities (open space resources, parks, libraries, etc.) be linked and oriented to existing developed areas of the community through road networks, public transit systems, open

space systems, bike way and pedestrian systems, and other physical connections.

Community Form – Jobs/Housing and Economic Development - Policy 1: Strive for a land use mix and pattern of development that provides linkages between jobs and employment uses, will provide a reasonable jobs/housing balance, and will maintain the fiscal viability of the City.

Community Form – Community Design - Policy 2: Continue to develop and apply design standards that result in efficient site and building designs, pedestrian friendly projects that stimulate the use of alternative modes of transportation, and the establishment of a functional relationship between adjacent developments.

Community Form – Community Design - Policy 3: Encourage project designs that place a high priority and value on open space, and the preservation, enhancement and incorporation of natural resources and other features including consideration of topography, vegetation, wetlands, and water courses.

Community Form – Community Design - Policy 9: The location and preservation of native oak trees and oak woodlands shall be a primary factor in determining site design, building location, grading, construction and landscaping, and in establishing the character of projects through their use as a unifying element in both new and existing development.

Growth Management Policy 8: Manage growth in such a way to ensure that significant open space areas will be preserved.

Circulation – Level of Service - Policy 2: Strive to meet the level of service standards through a balanced transportation system that reduces the auto emissions that contribute to climate change by providing alternatives to the automobile and avoiding excessive vehicle congestion through roadway improvements, Intelligent Transportation Systems, and transit improvements.

Circulation – Transit - Policy 1: Pursue and support transit services within the community and region and pursue land use, design and other mechanisms that promote the use of such services.

Circulation – Transportation System Management - Policy 1: Continue to enforce the City's TSM ordinance and monitor its effectiveness.

Circulation – Bikeway/Trails – Policy 1: Develop a comprehensive and safe system of recreational and commuter bicycle routes and trails that provides connections between the City's major employment and housing areas and between its existing and planned bikeways.

Air Quality and Climate Change Policy 4: As part of the development review process, develop mitigation measures to minimize stationary and area source emissions.

Air Quality and Climate Change – Transportation and Circulation - Policy 5: Develop transportation systems that minimize vehicle delay and air pollution.

Air Quality and Climate Change – Transportation and Circulation – Policy 6: Develop consistent and accurate procedures for mitigating transportation emissions from new and existing projects.

Air Quality and Climate Change – Transportation and Circulation – Policy 7: Encourage alternative modes of transportation including pedestrian, bicycle, and transit usage.

Air Quality and Climate Change – Energy Conservation – Policy 10: Conserve energy and reduce air emissions by encouraging energy efficient building designs and transportation systems.

Open Space and Conservation – Open Space System – Policy 1: Provide an interconnecting system of open space corridors that, where feasible, incorporate bikeways and pedestrian paths.

Open Space and Conservation – Open Space System – Policy 2: Provide interconnected open space corridors between open space and habitat resources, recreation areas, schools, employment, commercial service and residential areas.

Open Space and Conservation – Open Space System – Policy 4: Require all new development to provide linkages to existing and planned open space systems. Where such access cannot be provided through the creation of open space connections, identify alternative linkages.

Open Space and Conservation – Open Space System – Policy 6: Take into account consideration of natural habitat areas in developing linkages and in preserving open space areas. Identify alternate sites for linkages where sensitive habitat areas have the potential to be adversely impacted.

Open Space and Conservation – Open Space System – Policy 7: Maximize opportunities for preservation and maintenance of open space resources, including establishment of private open space areas. Consider coordination with non-profit organizations and investigate the potential for conservancy ownership and/or management of open space areas.

Open Space and Conservation – Vegetation and Wildlife – Policy 1: Incorporate existing trees into development projects, and where preservation is not feasible, continue to require mitigation for the loss of removed trees. Particular emphasis shall be placed on avoiding the removal of groupings or groves of trees.

Open Space and Conservation – Vegetation and Wildlife – Policy 2: Preserve and rehabilitate continuous riparian corridors and adjacent habitat along the City's creeks and waterways.

Open Space and Conservation – Vegetation and Wildlife – Policy 3: Require dedication of the 100-year flood plain or comparable mechanism to protect habitat and wildlife values in perpetuity.

Open Space and Conservation – Vegetation and Wildlife – Policy 4: Require preservation of contiguous areas in excess of the 100-year flood plain as merited by special resources or circumstances. Special circumstances may include, but are not limited to, sensitive wildlife or vegetation, wetland habitat, oak woodland areas, grassland connections in association with other habitat areas, slope or topographical considerations, recreation opportunities, and maintenance access requirements.

Open Space and Conservation – Groundwater Recharge and Water Quality – Policy 3: Ensure a buffer area between waterways and urban development to protect water quality and riparian areas.

Open Space and Conservation – Groundwater Recharge and Water Quality – Policy 5: Continue to monitor groundwater resources and investigate strategies for enhanced sustainable use. Areas where recharge potential is determined to be high shall be considered for designation as open space.

Parks and Recreation Policy 1: The City shall ensure the provision of 9 acres of park land per 1,000 residents

Parks and Recreation Policy 6: Take into consideration energy efficiency and water conservation, including the use of treated wastewater, in park development and design.

Public Facilities – Electric Utilities – Policy 5: Explore the feasibility of the development of and participation in renewable energy resources.

Public Facilities – Electric Utilities – Policy 6: Adopt a load/resource management plan, incorporating energy efficiency, conservation, load management, and reliability strategies, identifying program objectives and implementation and monitoring mechanisms.

Public Facilities – Electric Utilities – Policy 8: Pursue reasonable and cost-effective energy efficiency, conservation, and load management programs pertinent to the electric utility system.

Public Facilities – Electric Utilities – Policy 10: Require new development to pay a fair share of the cost of new sub-transmission and distribution needed to serve the development and to dedicate sites and easements needed for substations, transmission, sub-transmission, and distribution.

Public Facilities – Water System – Policy 10: Develop and implement water conservation standards and measures as necessary elements of the water system.

Public Facilities – Water System – Policy 11: Develop and implement an aquifer storage and recovery program.

Public Facilities – Wastewater and Recycled Water System – Policy 5: Explore potential alternatives to treatment and discharge.

Public Facilities – Wastewater and Recycled Water System – Policy 6: Develop, plan, and provide incentives for use of recycled water by the public and private sectors.

Public Facilities – Solid Waste, Source Reduction and Recycling – Policy 1: Ensure existing and future recycling sites and operations remain viable through application of land use compatibility standards.

Public Facilities – Solid Waste, Source Reduction and Recycling – Policy 2: Comply with the source reduction and recycling standards mandated by the State by reducing the projected quantity of solid waste disposed at the regional landfill by 50%, as well as any mandated future reductions.

Public Facilities – Solid Waste, Source Reduction and Recycling – Policy 5: Develop public education and recycling programs

Public Facilities – Water and Energy Conservation – Policy 1: Develop and implement water conservation standards.

Public Facilities – Water and Energy Conservation – Policy 2: Implement various water conservation plans developed by the Environmental Utilities Department.

Public Facilities – Water and Energy Conservation – Policy 3: Explore potential uses of treated wastewater.

Public Facilities – Water and Energy Conservation – Policy 4: Protect the quality and quantity of the City's groundwater and consider designating areas as open space where recharge potential is high.

Public Facilities – Water and Energy Conservation – Policy 5: Develop and adopt a landscape ordinance that provides standards for the use of drought tolerant, xeriscape, and water-conserving landscape practices for both public and private projects.

Public Facilities – Water and Energy Conservation – Policy 6: Develop and implement public education programs designed to increase public participation in energy, water conservation and recycled water use.

Public Facilities – Water and Energy Conservation – Policy 8: Enforce energy requirements and encourage development and construction standards that promote energy efficiency and conservation.

Public Facilities – Water and Energy Conservation – Policy 9: Preserve scarce resources by undertaking major projects in energy conservation and load management, including increasing efficiency in the City's electrical system.

Public Facilities – Water and Energy Conservation – Policy 10: Continue and expand energy efficiency and conservation programs to serve all utility users.

Safety – Flood Protection – Policy 1: Continue to regulate, through land use, zoning, and other restrictions, all uses and development in areas subject to potential flooding.

Safety – Flood Protection – Policy 2: Monitor and regularly update City flood studies, modeling and associated land use, zoning, and other development regulations.

Safety – Flood Protection – Policy 3: Continue to pursue a regional approach to flood issues.

Safety – Flood Protection – Policy 4: Provide flood warning and forecasting information to community residents to reduce impacts to personal property.

Safety – Flood Protection – Policy 5: Minimize the potential for flood damage to public and emergency facilities, utilities, roadways, and other infrastructure.

Safety – Flood Protection – Policy 6: Require new developments to provide mitigation to insure that the cumulative rate of peak run-off is maintained at pre-development levels.

Safety – Flood Protection – Policy 8: Establish flood control assessment districts or consider other funding mechanisms to mitigate flooding impacts.

Safety – Flood Protection – Policy 9: Where feasible, maintain natural stream courses and adjacent habitat and combine flood control, recreation, water quality, and open space functions.

8.4 IMPACTS

Significance Criteria

According to Section 15064.4 and Appendix G of the CEQA Guidelines, the proposed Fiddyment Ranch Specific Plan Amendment 3 project would have a significant environmental effect if the project would:

- Create a significant impact on the environment by generating greenhouse gas emissions, either directly or indirectly, that exceed 4.6 metric tons of CO2e per person per year;
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG; or
- Be affected by climate change effects, such as loss or substantial reduction in water supply reliability or exposure to increased flooding risks.

IMPACT 8.1:	**Generate Construction Related Greenhouse Gas Emissions**
APPLICABLE POLICIES AND REGULATIONS:	AB 32 City of Roseville General Plan
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant
MITIGATION MEASURES:	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Construction of the proposed project would generate GHG emissions through consumption of fuel for construction equipment, vehicles transporting materials to and from the site, and vehicles transporting construction workers to and from the site. As discussed in Chapter 7 Air Quality, The CalEEMod model was used to quantify emissions estimates produced through construction and buildout of the proposed Fiddyment Ranch Specific Plan Amendment 3 project over a ten-year period, from 2011 to 2020. The actual buildout schedule will be dependent on market forces and could take longer than 10 years. However, the 10-year construction schedule was used in modeling to provide a conservative estimate of annual construction emissions.

Based on modeling results from CalEEMod Version 2011.1.1, released on March 16, 2011, construction-related activities would generate a project total of approximately 6,034 MT over the ten years between 2011 and 2020, at an average rate of 603.4 tons per year. Construction-related GHG emissions would then cease upon completion of the construction phase of the project and would therefore represent a minor fraction of total project-related emissions, when considering the longevity of operational emissions associated with the project. Details of the GHG emissions modeling for project construction are provided in the Air Quality Impact Analysis (Shaw Environmental 2011) provided in Appendix D to this Draft Subsequent EIR.

The City of Roseville and the Placer County APCD have not adopted significance thresholds for GHG emissions. Instead, the thresholds recently adopted by the Bay Area Air Quality Management District (AQMD) are applied to this analysis. The thresholds adopted by the Bay Area AQMD were based on statewide data relating land uses to GHG emission rates and statewide targets for reductions in GHG emissions. The thresholds were adopted following a process that provided opportunity for public review and comment. Information regarding the process by which the thresholds were developed and adopted is available at the Bay Area AQMD's website at:

http://www.baaqmd.gov

The Bay Area AQMD thresholds include three tiers of emissions, which are applicable to various types of projects. The threshold applicable to a Specific Plan project is a per capita volume of 4.6 metric tons of CO2e per person per year. The population that can be applied to this threshold is defined as the "service population" of a project, which includes residents and employees of the land uses proposed for development.

Development of the portions of the Fiddyment Ranch area of the WRSP affected by the proposed Specific Plan Amendment would include a total of 4,716 residential units and 7.27 acres of community commercial land uses. Community commercial land uses may develop at a Floor-Area-Ratio of between 0.2 and 0.4. For this analysis, it is assumed that the commercial areas would develop at a Floor-Area-Ratio of 0.25, consistent with the analysis in the WRSP EIR and the project's Transportation Analysis (DKS, 2011). At this Floor-Area-Ratio, a total of 79,170 square feet of commercial land uses would be constructed. The WRSP EIR found that commercial developments typically support one employee for every 350 square feet of building space. Development of Fiddyment Ranch under the proposed project would be expected to support 226 employees. The City's average residential population is 2.54 individuals per residential unit. Development of 4,716 residential units in the portions of the Fiddyment Ranch area affected by the proposed project would be expected to support 10,607 residents. The total service population of the proposed Fiddyment Ranch Specific Plan Amendment 3 project would be 10,833 people. In comparison, if the proposed project is not approved, the total population of the portions of the Fiddyment Ranch area affected by the proposed project would be 7,140 (2,811 residential units and no community commercial land uses).

With an annual emission rate of 603.4 MTCO2e during project construction, and a service population of 10,833 people, construction of Fiddyment Ranch under the proposed project would generate 0.06 MTCO2e per person per year. The GHG emissions during construction would remain well below the Bay Area AQMD threshold, and construction of the proposed project would have a less than significant effect related to GHG emissions and the associated contribution to climate change effects. Further, these construction emissions would have a less than significant impact with respect to attainment and implementation of the state and City plans, policies, and regulations adopted for the purpose of reducing GHG emissions.

IMPACT 8.2:	**Generate Greenhouse Gas Emissions During Project Operation**
APPLICABLE POLICIES AND REGULATIONS:	AB 32 City of Roseville General Plan
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Significant
MITIGATION MEASURES:	Mitigation Measure 8.2a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Operation of the project would generate GHG emissions from onsite area sources, offsite energy production required for onsite activities and water use, and project-related vehicle trips. As discussed above, for the purposes of this analysis a 10-year buildout schedule is assumed, although it is likely that the actual buildout schedule will be longer. This assumption provides for a conservative analysis since emission rates are generally assumed to decrease over time as fuel efficiency for vehicles and energy and water efficiency for buildings increases. Under this analysis, the operational year of the project has been assumed to be 2021.

The number of vehicle trips associated with project operation used for this analysis is consistent with the project's Transportation Analysis (DKS 2011) provided in Appendix B to this Draft Subsequent EIR. Details of the GHG emissions modeling for this project are provided in the Air Quality Impact Analysis (Shaw Environmental 2011) provided in Appendix D to this Draft Subsequent EIR.

As discussed in **CHAPTER 7 AIR QUALITY**, Operational emissions were quantified using the CalEEMod model with project-specific data such as number of residential dwelling units, square footage for commercial type of development, elementary school, parks, and associated number of vehicle trips pertaining to land use. The CalEEMod modeling found that without implementation of mitigation measures, the project would emit an annual total of 60,407 MTCO2e, as shown in *Table 8.1*. With a service population of 10,833 people, the project would generate 5.6 MTCO2e per person per year. This exceeds the Bay Area AQMD threshold, indicating the project would have a significant impact related to GHG emissions.

Table 8.1
Unmitigated GHG Emissions

Source	CO2e Emissions (MT/Year)
Area Sources	10,003.92
Energy Consumption	10,245.73
Mobile Sources	37,576.67
Solid Waste	1,357.87
Water Consumption	1,222.42
Total	60,407

The project applicant contracted with BuildItGreen to complete a Green Point Ratings analysis for the Fiddyment Ranch development. The BuildItGreen program identifies a menu of options

that builders can select in order to increase energy and water efficiency for their products. Each menu item is associated with a particular point value or point value range. As described in *Mitigation Measure 8.2a*, the project applicant has committed to achieving a specific point rating for each housing type in order to reduce GHG emissions. For LDR areas within the portions of the Fiddyment Ranch area affected by the proposed Specific Plan Amendment, each house will achieve a BuildItGreen score of 101; each house within MDR areas of the proposed project will achieve a BuildItGreen score of 97; and each dwelling unit within HDR of the proposed project will achieve a BuildItGreen score of 105. In addition, *Mitigation Measure 8.2a* requires that a GreenPoint Rated Forecasted Climate Footprint Report be submitted with each tentative map application identifying the projected GHG emissions for the specific residential products included in that tentative map to demonstrate that the BuildItGreen menu options selected are effective at reducing GHG emissions to 4.6 MTCO2e per service population or less.

In preparing this analysis of the effectiveness of *Mitigation Measure 8.2a*, specific BuildItGreen menu options were selected for each residential density category. These design features are typical of the options that may actually be selected at the time that tentative maps are processed. The options included in the CalEEMod modeling are:

- **Indoor Water Usage:** High efficiency toilets, lavatory faucets, kitchen/utility faucets, and shower fixtures
- **Outdoor Water Usage:**
  - All residential areas – for developer-installed landscaping, group landscaping plants by water needs; mulch all planting beds; avoid planting invasive plants; 75 percent of plants are drought tolerant, California natives or Mediterranean species or other appropriate species
  - MDR - Turf is less than 25 percent of landscaped area, install high-efficiency irrigation systems
  - HDR - turf shall not be installed on slopes exceeding 10 percent and no overhead sprinklers shall be installed in areas less than 8 feet wide; turf is less than 10 percent of landscaped area; plant shade trees; install high-efficiency irrigation systems; incorporate two inches of compost in the top 6 to 12 inches of soil
- **Energy Usage:**
  - All homes – no fireplaces, provide high-efficiency HVAC system and filters, install Energy Star bathroom fans on timer or humidistat, install whole house fans, install Energy Star dishwashers
  - HDR - exceed Title 24 energy efficiency by 17 percent
  - MDR - minimum 16-inch overhangs and gutters, verify quality of insulation installation & thermal bypass checklist before drywall, house passes blower door test, exceed Title 24 energy efficiency by 17 percent, provide built-in recycling center
  - LDR - minimum 16-inch overhangs and gutters, verify quality of insulation installation & thermal bypass checklist before drywall, house passes blower door test, exceed Title 24 energy efficiency by 15 percent, provide built-in recycling center

Table 8.2 presents the estimated GHG emissions with implementation of *Mitigation Measure 8.2a,* as determined by the CalEEMod model. As shown, it is estimated that GHG emissions resulting from operation of the proposed Fiddyment Ranch Specific Plan Amendment 3 project (the portions of Fiddyment Ranch affected by the proposed Specific Plan Amendment) are expected to be 41,126.47 MTCO2e per year.

Table 8.2
Mitigated GHG Emissions

Source	CO2e Emissions (MT/Year)
Area Sources	50.70
Energy Consumption	9,405.01
Mobile Sources	30,921.68
Solid Waste	0.00
Water Consumption	749.08
Total	41,126.47

With a service population of 10,833 people, the project is expected to generate GHG emissions of 3.8 MTCO2e per person per year. The GHG emissions during project operation would remain below the Bay Area AQMD threshold of 4.6 MTCO2e per person per year, and operation of the proposed project would have a less than significant impact related to GHG emissions and the associated contribution to climate change effects.

IMPACT 8.3:	**Conflict With an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases**
APPLICABLE POLICIES AND REGULATIONS:	City of Roseville General Plan AB 32
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Significant
MITIGATION MEASURES:	Mitigation Measure 8.3a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

As demonstrated in Impacts 8.1 and 8.2, , construction of the proposed project would generate GHG emissions that remain below the threshold adopted by the Bay Area AQMD while operation of the proposed project would generate GHG emissions that exceed the threshold adopted by the Bay Area AQMD. With implementation of mitigation, the project's operational emissions would be reduced below the Bay Area AQMD threshold, which is measured on a per capita basis. However, the project would generate a substantial amount of GHG emissions every year throughout project operation. The City of Roseville has adopted many policies to guide land use development towards minimizing GHG emissions, ensuring individual projects contribute to the State's GHG targets under AB 32, and minimizing the exposure of City residents to the effects of climate change. The following list demonstrates how the proposed project would comply with those policies. The proposed project:

- Provides urban levels of development consistent with the SACOG Blueprint and increases residential density relative to the previously approved WRSP;
- Preserves open space and existing trees along area creeks;
- Mixes commercial and public land uses with residential areas which may reduce vehicle miles traveled;
- Provides transit and bicycle facilities that are linked to public and commercial land uses and other existing facilities in the City;
- Avoids development in the 100-year floodplain and adjacent to waterways;
- Provides parkland in excess of City requirements;
- Implements a water conservation plan; and
- Uses recycled water.

In addition, *Mitigation Measure 8.3a* requires the project to include energy and water efficiency features in buildings and landscaping. Given the proposed project design considerations reflected above and the requirements of *Mitigation Measure 8.3a*, the project would not conflict with applicable plans, policies or regulations adopted for the purpose of reducing GHG emissions. This impact would remain less than significant with implementation of mitigation.

IMPACT 8.4:	**Be Affected by Climate Change Effects**
APPLICABLE POLICIES AND REGULATIONS:	AB 32
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant
MITIGATION MEASURES:	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Although there is consensus that global warming is occurring and is greatly influenced by human activity, there is less certainty as to the timing, severity and potential consequences of global climate change. Nonetheless, the following provides information on the potential effects of climate change on development within Fiddyment Ranch under the proposed Fiddyment Ranch Specific Plan Amendment 3 project.

Temperature

An increase in average annual temperatures would, by itself, have little effect on the proposed project, other than increasing the demand for irrigation from increased evapo-transpiration rates, and increasing overall energy demand to meet air conditioning needs.

Precipitation

Although global climate change models generally predict an increase in overall precipitation on a worldwide scale, regional models applied to California predict both increases and decreases in annual precipitation. Therefore, the data have been inconclusive in formulating agreed-on predictions of future conditions.

According to the California Department of Water Resources (DWR), when trends are analyzed for northern, central and southern California, they show that precipitation in the northern

portion of the state appears to have increased slightly from 1890 to 2002, while precipitation in the central and southern areas has decreased slightly. All changes were in the range of one to three inches annually. These changes are not expected to substantially affect the proposed project.

Snow Pack/Surface Water Supply

California's annual snow pack is deposited primarily between the months of November and March. The snow pack typically melts from April through July, which in turn feeds the American and Sacramento Rivers. Snowmelt provides significant quantities of water to streams and reservoirs for several months after the annual storm season has ended.

The snow pack is important to the state's annual water supply because of its volume and the time of year that it typically melts. Average runoff from melting snow pack provides about 20 percent of the state's total annual natural runoff and roughly 35 percent of the state's total usable annual surface water supply. The state's snow pack is estimated to contribute an average of about 15 million acre-feet of runoff each year, about 14 million acre feet of which is estimated to flow into the Central Valley. In comparison, total reservoir capacity in watersheds with snowmelt contributions and that serve the Central Valley is about 24.5 million acre feet.

According to DWR, total water runoff from snow pack into Sacramento Valley rivers remained the same between the months April through July, 1906 through 2002; however, more runoff occurred in the form of rain during the winter months, and less as a result of melting snow during the spring and early summer. This shift towards a greater relative proportion of rain rather than snow could have ramifications on water supply, since snow pack is the primary storage mechanism for potable surface water supplies. As warming trends continue, it is reasonable to surmise that snow pack will be reduced and could melt earlier. This phenomenon could affect the proposed project indirectly by altering the timing and volume of runoff that feeds Folsom Lake, which provides water to the project area. The management of reservoirs generally, including the management of Folsom Reservoir by the Bureau of Reclamation, may need to be altered to account for seasonal variations in precipitation type and intensity. Upstream water management is complex, because it serves multiple purposes such as flood control and habitat management.

The City of Roseville is taking a proactive approach in the face of future uncertainties, and requested the Fiddyment Ranch Specific Plan Amendment 3 applicants to prepare a water conservation strategy, which has been incorporated into the project, to reduce Fiddyment Ranch water demands. This will assist the City in continuing to provide water to City residents in the face of potential future reductions in surface water supply. At a state or regional level, it is expected that new technologies for water supply, treatment and water use efficiency, implementation of water transfers and conjunctive use, coordinated operation of reservoirs, improved flow forecasting, and the cooperation of local, regional, state, and federal agencies will be needed to help California respond to the effects of global climate change on water supply.

Based on increasing knowledge of climate change, it is reasonable to expect that California will adapt the State's water system to meet demands created by climate change, including changes to a warmer winter season. Measures that are likely include augmenting traditional water

supply reservoir operations with other actions such as conservation, conjunctive use, desalination, and changes to water portfolios. Climate change is expected to have a greater effect on Southern California and agricultural users than urban users in the Sacramento Valley.

Although California could experience an increased number of single-dry and multiple dry years as a result of global climate change, based on current knowledge it is reasonably expected that such increase would not significantly affect the ability of the City of Roseville to reliably meet the build-out water demands for Fiddyment Ranch. As described in Appendix E1, *Fiddyment Specific Plan Amendment 3 Water Supply Assessment*, adequate water supply is available to reliably meet all of the projected existing City demands and the increased water demands resulting from the proposed Fiddyment Ranch Specific Plan Amendment 3 project, even under single-year and multiple year drought conditions.

Importantly, the City of Roseville's surface water supply entitlements have historically demonstrated a high reliability during even multiple-dry years, as discussed in **CHAPTER 9A WATER SUPPLY**. Even during the time between 1987 and 1992, when California experienced a five-year drought, Roseville had sufficient water to serve its customers. In addition, on an as-needed basis, Roseville would supplement its surface water supplies with groundwater in dry years to improve reliability and ensure that all city water needs are met. Although, as discussed below, there is still a great deal of uncertainty in respect to potential impacts of climate change on future groundwater availability in California, in view of the high reliability of Roseville surface water, the wide variety of water management techniques available to the City, and predictions about the effects of climate change on water supply in the geographic area of Fiddyment Ranch, the long term water supply is considered sufficient.

Ground Water Supply

Little work has been performed on the effects of climate change on specific groundwater basins or groundwater recharge characteristics. Changes in rainfall and changes in the timing of the groundwater recharge season could result in changes in recharge rates. Warmer temperatures could increase the rate of evaporation, which would reduce percolation. The City of Roseville is separately pursuing an Aquifer Storage and Recovery program, which would enable the city to inject surplus water into the groundwater table.

The Placer County Water Agency (PCWA) integrated water resources strategy anticipates that groundwater pumping would not exceed safe yields as long as the long-term multiple years average does not exceed 95,000 acre-feet per year (AFY). Long-term average groundwater pumping is not expected to exceed the 95,000 AFY average. Therefore, it is expected that groundwater will be a reliable back-up or supplemental water source for the City of Roseville.

Storms and Extreme Events

Weather events are a natural part of any climate system. Although the climate in the project area is very stable and relatively predictable (hot, dry summers and cool, wet winters), there can be variations over periods of time including droughts or severe storms. There is a potential that climate change could lead to more intense local storms and changes in runoff patterns and more frequent and longer periods of drought. There is a potential California could experience an increased number of single dry, multiple dry, and critically dry years as a result of global climate change. However, it is not possible to predict with any accuracy these types of events.

Development in Fiddyment Ranch must comply with the City's requirements to provide adequate stormwater facilities in the event of storms, and would implement a water conservation program to minimize demand for water supply.

Rise in Sea Level

A consistent rise in sea level has been recorded worldwide over the last 100-years. Based on climate change modeling, a rise in sea level is expected to continue, including along the California Coast. Given the location and altitude of Fiddyment Ranch, it would not be affected by a rise in sea level, even if the Sacramento Delta were to be impacted.

For these reasons, the impacts of global climate change on residents of Fiddyment Ranch are considered less than significant.

8.5 MITIGATION MEASURES

Generate Construction Related Greenhouse Gas Emissions

This impact is determined to be less than significant. No mitigation measures are required.

Generate Greenhouse Gas Emissions During Project Operation

Mitigation Measure 8.2a: Greenhouse gas emissions within the project area shall be reduced by including energy and water efficiency features and designs in each residential unit. All residential units within LDR areas of portions of Fiddyment Ranch affected by the proposed Specific Plan Amendment shall achieve a BuildItGreen score of 101; all residential units within MDR areas of portions of Fiddyment Ranch affected by the proposed Specific Plan Amendment shall achieve a BuildItGreen score of 97; and all residential units within HDR areas of portions of Fiddyment Ranch affected by the proposed Specific Plan Amendment shall achieve a BuildItGreen score of 105. A GreenPoint Rated Forecasted Climate Footprint Report shall be submitted with each tentative map application identifying the projected GHG emissions for the specific residential products included in that tentative map to demonstrate that the BuildItGreen menu options selected to achieve the required scores are effective at reducing GHG emissions to 4.6 MTCO2e per service population or less.

Conflict With an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases

Mitigation Measure 8.3a: Each future applicant for tentative map approval shall implement *Mitigation Measure 8.2a* by meeting the identified BuildItGreen scores and submitting a GreenPoint Rated Forecasted Climate Footprint Report demonstrating that GHG emissions from all units within each tentative map will be 4.6 MTCO2e per service population or less.

Be Affected by Climate Change Effects

This impact is determined to be less than significant. No mitigation measures are necessary.

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