3 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES

3.0 APPROACH TO THE ENVIRONMENTAL ANALYSIS AND THE CUMULATIVE CONTEXT

3.0.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

INTRODUCTION

The California Environmental Quality Act (CEQA) Guidelines (State CEQA Guidelines) require an environmental impact report (EIR) to include an evaluation of potentially significant effects on the physical environment associated with the project and to identify feasible mitigation for those effects. All phases of the project, including planning, acquisition, development, and operation, are evaluated in the analysis. California Code of Regulations (CCR) Title 14, Section 15126.2 (14 CCR Section 15126.2) states that:

> An EIR shall identify and focus on the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, and human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services. The EIR shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected.

An EIR must also discuss inconsistencies between the proposed project and applicable general plans and regional plans (14 CCR Section 15125[d]).

According to 14 CCR Section 15126.4, an EIR must describe potentially feasible measures that could avoid or minimize significant adverse impacts (CCR Section 15126.4[a][1]) and feasible and practicable measures that are fully enforceable through permit conditions, agreements, or other legally binding process (CCR Section 15126.4[a][2]). Mitigation measures are not required for impacts that are found to be less than significant.

The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) (the "NEPA regulations") specify that a Federal agency preparing an environmental impact statement (EIS) must consider the effects of the Proposed Action and alternatives under consideration on the environment; these include effects on ecological, aesthetic, and historical and cultural resources, and economic, social, and health effects. An EIS must also discuss possible conflicts with the objectives of Federal, state, regional, and local adopted land use plans, policies, or controls for the area concerned; energy requirements and conservation potential; urban quality; the relationship between short-term uses of the environment and long-term productivity; and irreversible or irretrievable commitments of resources. An EIS must identify relevant, reasonable mitigation measures that are not already included in the proposed action or alternatives under consideration that could avoid, minimize, rectify, reduce, eliminate, or compensate for the project's adverse environmental effects (40 Code of Federal Regulations [CFR] 1502.14, 1502.16, 1508.8).

This draft document is known as a draft EIR/EIS (DEIR/DEIS). The following discussion introduces Chapter 3 of this EIR/EIS, which addresses the affected environment, environmental consequences, and mitigation measures for each environmental issue area, and explains the organization and general assumptions used in the analysis. Specific assumptions and methodology and significance criteria (thresholds of significance) used in the analysis and determination of significance of impacts are contained in each individual technical section.

SECTION CONTENTS AND DEFINITION OF TERMS

For ease of reference and to prevent confusion, the environmental setting, impacts, and mitigation measures required by CEQA have been prepared largely using NEPA terminology (e.g., affected environment, environmental consequences, and mitigation measures) but all sections comply with CEQA and NEPA regulations. The terms “Effect” and “Impact” are synonymous as used herein (40 CFR 1508.8). This chapter is organized by issue area, generally corresponding to topics in the CEQA Environmental Checklist (State CEQA Guidelines Appendix G, as amended), with the addition of “Environmental Justice,” which is required in the NEPA analysis pursuant to Presidential Executive Order 12898. As described below, each section follows the same format.

Affected Environment

The “Affected Environment” subsection provides an overview of the baseline physical environmental conditions (i.e., the environmental baseline) on the project study sites, and surrounding areas as appropriate, in accordance with NEPA regulations (40 CFR 1502.10) and 14 CCR Section 15125, at the time the notice of preparation (NOP) was published on July 14, 2006. However, the City and the USACE acknowledge that due to the recent economic downturn, the Rancho Cordova area and the region as a whole have experienced a substantial slowdown in the rate of buildout of all types of projects. Full buildout of the SunCreek Specific Plan is expected to take 20 years.

This approach is consistent with the State CEQA Guidelines (14 CCR Section 15125). NEPA requires a description of the Affected Environment, which is the environment of the area(s) to be affected or created by the alternatives under consideration. The baseline physical conditions required under CEQA will ensure compliance with the NEPA requirement for Affected Environment. This approach also has the virtue of avoiding the potential confusion that might result from using different baselines for CEQA and NEPA purposes.

Regulatory Framework

The “Regulatory Framework” subsection identifies the plans, policies, laws, regulations, and ordinances that are relevant to each topical section and describes required authorizations, permits, and other approvals necessary to implement the project. As noted above, the EIR/EIS needs to address possible conflicts between the Proposed Project or alternatives under consideration and the objectives of Federal, state, regional, or local formally adopted land use plans, policies, or controls for the area.

Conflicts with any Federal, state, or local formally adopted land use plans, policies, or controls for the area are considered appropriate topics under NEPA and must be addressed in the EIS (40 CFR 1502.16[c]). The City has analyzed the project for consistency with the policies of the adopted City General Plan for the action alternatives. According to State CEQA Guidelines CCR Section 15125(d), an EIR “shall discuss any inconsistencies between the proposed project and applicable general plans and regional plans.” Although the EIR/EIS discusses inconsistencies with applicable plans and policies for several jurisdictions, the final authority for interpreting policy statements and determining the project’s consistency with adopted policies rests with the governing body of the jurisdiction in question. Where inconsistencies do occur, they are addressed as topical impacts within each applicable issue area in Chapter 3. For some issue areas there may not be any applicable policies of a particular jurisdiction’s general plan based on the type of improvements or changes proposed within that jurisdiction. Where this is the case, the “Regulatory Framework” section includes a note that there are no applicable policies from this jurisdiction’s general plan.

Environmental Consequences and Mitigation Measures

The “Environmental Consequences and Mitigation Measures” subsection identifies the impacts of the project on the existing human and natural environment, in accordance with the State CEQA Guidelines (CCR Sections 15125 and 15143) and NEPA regulations (40 CFR 1502.16). The following discussions are included in this subsection.

- **Thresholds of Significance** provide criteria established by the lead agencies to define at what level an impact would be considered significant in accordance with CEQA. Thresholds may be quantitative or qualitative; they may be based on examples found in CEQA regulations or the State CEQA Guidelines; scientific and factual data relative to the lead agency’s jurisdiction; legislative or regulatory performance standards of Federal, state, regional, or local agencies relevant to the impact analysis; City goals, objectives, and policies (e.g., City General Plan); views of the public in the affected area; the policy/regulatory environment of affected jurisdictions; or other factors. Generally, however, the thresholds of significance used are derived from Appendix G of the State CEQA Guidelines, as amended; a Federal agency’s NEPA regulations, where defined; factual or scientific information and data; and regulatory standards of Federal, state, regional, and local agencies. These thresholds also include the factors taken into account under NEPA to determine the significance of the action in terms of the context and the intensity of its effects.

- **Analysis Methodology** describes the methods, process, procedures, and/or assumptions used to formulate and conduct the impact analysis.

- **Impact Analysis** provides an assessment of the potential impacts of the project (including off-site infrastructure and roadway improvements) and alternatives on the affected environment. This assessment also specifies why impacts are found to be significant and unavoidable, significant or potentially significant, or less than significant, or why there is no environmental impact. Some of the potential impacts that may result from implementation of the Proposed Project and the other action alternatives may be temporary and short-term effects resulting from construction activities. However, impacts related to modification and loss of habitats, including fill of waters of the U.S.; and disturbance of cultural resources would be permanent.

- **Project impacts** are organized into three categories: direct, indirect, and cumulative impacts. Direct impacts are those that would be caused by the action and would occur at the same time and place. Indirect effects are reasonably foreseeable consequences that may occur at a later time, or at a distance that is removed from the project site. Examples of indirect effects include growth-inducing effects and other effects related to changes in land use patterns, population density, or growth rate, and related effects on the physical environment.

  The impacts are listed numerically and sequentially throughout each section. For example, impacts in Section 3.3 are identified as 3.3-1, 3.3-2, and so on and are identified by the alternative that is applicable to the impact. For example, “NP” refers to the No Project Alternative, “NCP” refers to the No U.S. Army Corps of Engineers (USACE) Permit Alternative, “BIM” refers to the Biological Impact Minimization Alternative, “CS” refers to the Conceptual Strategy Alternative, and “ID” refers to the Increased Development Alternative. An impact statement precedes the discussion of each impact and provides a summary of the impact. The discussion that follows the impact statement includes the evidence on which a conclusion is based regarding the level of impact. Impact conclusions are made using the significance criteria described above and include consideration of the “context” of the action and the “intensity” (severity) of its effects in accordance with NEPA guidance (40 CFR 1508.27).

  The level of impact of the Proposed Project and the other alternatives under consideration is determined by comparing estimated effects with baseline conditions. Under CEQA, the environmental setting as it exists at the time the NOP is published (as defined above and as described in the “Affected Environment” sections of Chapter 3) normally represents baseline physical conditions. Under NEPA, the No Action Alternative (expected future conditions without the project) is the baseline against which the effects of a Proposed Action and action alternatives are compared. Although, in some instances, a NEPA "no action" scenario can involve significant anticipated changes to existing conditions based on actions taken by nonfederal parties, here the NEPA no action scenario is the same as the CEQA no project scenario. This approach, being conservative from an impact assessment standpoint, is permissible under NEPA and avoids any confusion that might be caused if this document used separate CEQA and NEPA baselines.

- **Mitigation measures** to avoid, minimize, rectify, reduce, or compensate for significant and potentially significant impacts of the project, in accordance with the State CEQA Guidelines (14 CCR Sections 15370, 15002[a][3], 15021[a][2], and 15091[a][1]) and with NEPA regulations (40 CFR Part 1508, Section 20), where feasible, are recommended for each significant impact. Each mitigation measure is identified numerically to correspond with the number of the impact being reduced by the measure. For example, Impact 3.3-1 would be mitigated by Mitigation Measure 3.3-1. Where no mitigation is required because the impact conclusion is "less than significant," then the statement "no mitigation measures are required" is provided. Where no feasible mitigation is available to reduce impacts to a less-than-significant level, the impacts are identified as remaining "significant and unavoidable" and the statement "no mitigation measures are available" is provided with an explanation. (In some cases, all feasible and available mitigation measures are not sufficient to reduce an impact to a "less-than-significant" level. When this occurs, the impacts are described as remaining "significant and unavoidable.") Significant and unavoidable impacts are also summarized in Chapter 4, "Other Statutory Requirements," under the subsection "Significant and Unavoidable Adverse Impacts."

- The **Residual Significant Impacts** subsection identifies any significant impacts that would still be significant even after implementation of the mitigation measures.

- The **Cumulative Impacts** subsection discusses impacts of the project that would result from the incremental impact of the action when compounded with other past, present, and reasonably foreseeable future actions. More information related to cumulative impacts is described below in Section 3.0.5, "Cumulative Context."

TERMINOLOGY USED TO DESCRIBE IMPACTS

Impact Levels

The EIR/EIS for this project uses the following terminology to denote the significance of environmental impacts of the project:

- **No impact** indicates that the construction, operation, and maintenance of the project would not have any direct or indirect effects on the environment. It means no change from existing conditions. This impact level does not need mitigation.

- A **less-than-significant impact** is one that would not result in a substantial or potentially substantial adverse change in the physical environment. This impact level does not require mitigation, even if feasible, under CEQA.

- A **significant impact** is defined by CEQA Section 21068 as one that would cause "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project." Levels of significance can vary by project, based on the change in the existing physical condition. This EIR/EIS uses the CEQA definition of significant impact because it is more stringent than that of NEPA. Under CEQA, mitigation measures or alternatives to the proposed project must be provided, where feasible, to reduce the magnitude of significant impacts.

- A **potentially significant impact** is one that, if it were to occur, would be considered a significant impact as described above; however, the occurrence of the impact cannot be immediately determined with certainty. For CEQA purposes, a potentially significant impact is treated as if it were a significant impact.

- A **significant and unavoidable impact** is one that would result in a substantial or potentially substantial adverse effect on the environment, and that could not be reduced to a less-than-significant level even with any feasible mitigation. Under CEQA, a project with significant and unavoidable impacts could proceed, but the lead agency would be required to prepare a "statement of overriding considerations" in accordance with State CEQA Guidelines CCR Section 15093, explaining why the lead agency would proceed with the project in spite of the potential for significant impacts.

- A **beneficial impact** is an impact that is considered to cause a positive change or improvement in the environment and for which no mitigation measures are required.

- An impact may have a level of significance that is too uncertain to be reasonably determined, which would be designated **too speculative for meaningful evaluation**, in accordance with State CEQA Guidelines CCR Section 15145. Where some degree of evidence points to the reasonable potential for a significant effect, the EIR/EIS may explain that a determination of significance is uncertain, but is still assumed to be "potentially significant," as described above. In other circumstances, after thorough investigation, the determination of significance may still be too speculative to be meaningful. This is an effect for which the degree of significance cannot be determined for specific reasons, such as because aspects of the impact itself are either unpredictable or the severity of consequences cannot be known at this time.

Impact Mechanisms

Mechanisms that could cause impacts are discussed for each issue area. General categories of impact mechanisms are construction of the project and activities related to future operations, as described in Chapter 2, "Alternatives."

If the project is approved, site work could begin as early as 2012. The environmental analysis focuses on baseline at the time the NOP was published (2006). The project is expected to be completed in by 2032. Project effects fall into the following categories:

- A **temporary effect** would occur only during construction or demolition activities. The environmental analysis addresses potentially significant impacts from the direct effects of construction at the project site, including but not limited to: demolition of existing structures and buildings, direct effects associated with site development and required on- and off-site infrastructure and roadway improvements, and indirect construction impacts associated with the proposed construction staging areas, fill activities, and construction traffic.

- A **short-term effect** would last from the time construction ceases to within 3 years following construction.

- A **long-term effect** would last longer than 3 years following completion of construction. In some cases, a long-term effect could be considered a permanent effect.

- A **direct effect** is an effect that would be caused by an action and would occur at the same time and place as the action.

- An **indirect effect** is an effect that would be caused by an action but would occur later in time, or at another location, yet is reasonably foreseeable in the future.

In accordance with California Public Resources Code Section 21081.6(a), the City Council, if it approves the project, will adopt a mitigation monitoring and reporting program (MMRP) at the time that it certifies the EIR. The City Council will also be required to adopt findings identifying each significant effect of the project and the extent to which feasible mitigation measures have been adopted. (California Public Resources Code Section 21081.) USACE will also issue a record of decision (ROD) that will reflect USACE's final decision, the rationale behind the decision, and a commitment to monitoring and mitigation. According to Section 1505.2 of the NEPA regulations adopted by the CEQ, the ROD must do all of the following:

(a) State what the decision was.

(b) Identify all alternatives considered by the agency in reaching its decision, specifying the alternative or alternatives which were considered to be environmentally preferable. An agency may discuss preferences among alternatives based on relevant factors including economic and technical considerations and agency statutory missions. An agency shall identify and discuss all such factors including any essential considerations of national policy which were balanced by the agency in making its decision and state how those considerations entered into its decision.

(c) State whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation.

The following terms are also used in the impact analysis:

- **Construction** applies to activities associated with ground disturbance, construction of new structures and supporting infrastructure and roadways, and the demolition of existing structures and buildings.

- **No mitigation measures are required** is stated in the discussion of mitigation if the impact is considered minimal or less than significant and does not require mitigation.

- **No feasible mitigation measures are available** is stated in the discussion of mitigation if the impact is considered significant and unavoidable, and there is no feasible mitigation available to reduce the magnitude of the impact to a less-than-significant level.

MITIGATION MEASURES OUTSIDE LEAD AGENCY JURISDICTION

Improvements in the off-site utility infrastructure would be outside the jurisdiction of the City of Rancho Cordova. These improvements would fall under the jurisdiction of other agencies, such as Sacramento County or the California Department of Transportation (Caltrans). Neither the City of Rancho Cordova nor the project applicants could control the timing or implementation of project components or mitigation measures which would take place outside of the City of Rancho Cordova's jurisdiction. In cases where the City is responsible for implementing mitigation outside of its jurisdiction, the City is also responsible for coordinating with the affected jurisdiction(s) to ensure that the mitigation measures proposed in this EIR/EIS may be implemented as described.

3.0.2 CUMULATIVE CONTEXT

INTRODUCTION TO THE CUMULATIVE ANALYSIS

This EIR/EIS provides an analysis of overall cumulative impacts of the SunCreek Specific Plan project considered along with other past, present, and probable future projects producing related impacts, as required by the State CEQA Guidelines (14 California CCR Section 15130) and "reasonably foreseeable" future projects under NEPA implementing regulations (40 CFR 1508.7). The purpose of this analysis is twofold: first, to determine whether the overall long-term impacts of all such projects would be cumulatively significant and second, to determine whether SunCreek Specific Plan project itself would cause a "cumulatively considerable" (and thus significant) *incremental* contribution to any such cumulatively significant impacts. (See the State CEQA Guidelines [CCR Sections 15064(h), 15065(c), 15130(a), 15130(b), and 15355(b)]). In other words, the required analysis first creates a broad context in which to assess the project's incremental contribution to anticipated cumulative impacts, viewed on a geographic scale well beyond the project site itself. The analysis then determines whether the project's incremental contribution to any significant cumulative impacts from all projects is itself significant (i.e., "cumulatively considerable" in CEQA parlance).

Cumulative impacts are defined in the State CEQA Guidelines (CCR Section 15355) as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact occurs from "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (CCR Section 15355[b]).

Consistent with the State CEQA Guidelines (CCR Section 15130[a]), the discussion of cumulative impacts in this EIR/EIS focuses on significant and potentially significant cumulative impacts. The State CEQA Guidelines (CCR Section 15130[b]) state that:

> The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

CEQ regulations implementing provisions of NEPA define cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions over time (40 CFR 1508.8). They are caused by the incremental increase in total environmental effects when the evaluated project is added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can thus arise from causes that are totally unrelated to the project being evaluated, and the analysis of cumulative impacts looks at the life cycle of the effects, not the project at issue.

PROJECTS CONTRIBUTING TO POTENTIAL CUMULATIVE IMPACTS

The State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the project is to be considered: the use of a list of past, present, and probable future projects (the "list approach") or the use of adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (the "plan approach"). Either of these methodologies also fulfill the NEPA requirements for cumulative impact analysis (CEQ 1997). For this EIR/EIS, both the list and plan approaches have been utilized to generate the most reliable future projections possible.

GEOGRAPHIC CONTEXT FOR CUMULATIVE IMPACTS

Sacramento County as a whole, including the City of Rancho Cordova, are facing numerous regional issues pertaining to air quality degradation, traffic congestion, biological habitat loss, water quality degradation, and other urban-related environmental changes, which are discussed in greater detail below.

Sacramento County

Sacramento County encompasses approximately 775 square miles in the middle of the 400-mile-long Central Valley, which is California's prime agricultural region. Sacramento County is bordered by Contra Costa and San Joaquin Counties on the south, Amador and El Dorado Counties on the east, Placer and Sutter Counties on the north, and Yolo and Solano Counties on the west. Sacramento County extends from the low delta lands between the Sacramento and San Joaquin Rivers north to about 10 miles beyond the State Capitol and east to the foothills of the Sierra Nevada. The southernmost portion of Sacramento County has access to the San Francisco Bay via the Sacramento River. Sacramento County lies at the geographic center of the region and spans both agricultural land uses as well as the most urbanized areas of the region. The geographic boundaries of Sacramento County include seven incorporated cities: Sacramento, Folsom, Rancho Cordova, Citrus Heights, Elk Grove, Galt, and Isleton.

The highest densities of employment and residential uses are located in the urban core of the city of Sacramento. Two of the three regional employment centers are located in Sacramento County, one in downtown Sacramento and the more recent along U.S. Highway 50 (U.S. 50) in the cities of Rancho Cordova and Folsom. Land uses north of the American River are primarily suburban residential with concentrations of commercial and employment uses along major transportation routes. The southern end of the region (e.g., south Sacramento, the unincorporated Vineyard community, the cities of Elk Grove and Galt) is predominantly residential, with the latter three areas at fairly low-suburban to rural densities. The Cosumnes River floodplain and existing agricultural operations separate the cities of Elk Grove and Galt. The southeast county (outside of existing cities and the county Urban Services Boundary [USB]) is in agricultural use with pockets of rural residential communities.

Growth in Sacramento County is occurring and is projected to occur primarily in the cities of Elk Grove and Rancho Cordova and in the community of Natomas, which are the only remaining areas of the county within the USB where land is available.

New residential development is expected to result from buildout of vacant and underutilized parcels; planned communities, including Elverta, East Antelope, Vineyard Springs, North Vineyard Station, and Florin Vineyard Gap; mixed-uses in commercial corridors; and the West of Watt, Easton, Jackson Highway Corridor, and Grant Line East New Growth Areas. Approximately 113,000 housing units could be developed from buildout of these areas (Sacramento County 2009a).

According to the Sacramento Area Council of Government's (SACOG's) Sacramento Region Blueprint, the unincorporated portion of Sacramento County will grow by nearly 100,000 new jobs and 100,000 new housing units by 2030, indicating that this trend is likely to continue (Sacramento County 2009a). Accommodating the projected employment and the new residents will not only require more housing, but will also necessitate additional jobs, stores, human services, transportation system capacity, public facilities, and municipal and countywide services. The county population has grown from 1,041,219 in 1990 to 1,223,499 in 2000 (U.S. Census Bureau 2000a), and the population of the county as of January 1, 2008, was estimated to be 1,433,187 (California Department of Finance [DOF] 2009a).

City of Rancho Cordova

The City of Rancho Cordova encompasses approximately 20,000 acres in eastern Sacramento County. The Planning Area for the City of Rancho Cordova consists of the existing incorporated city and a larger study area (approximately 58,190 acres) and was selected based on the city limits and surrounding areas that are anticipated to be incorporated into the city in the future (City of Rancho Cordova 2006:3.0-1). The city limits and its Planning Area are generally bordered by the American River on the north, Prairie City Road and the boundary of the 100-year floodplain for the Cosumnes River on the east, Jackson Highway (SR 16) on the south, and Watt Avenue and the City of Sacramento on the west (City of Rancho Cordova 2006).

The city is characterized by a wide range of existing land uses, including residential developments, commercial/retail/office uses, industrial uses, and institutional uses. The majority of the commercial, office, and retail uses are located along the Sunrise Boulevard and Folsom Boulevard corridors. Industrial, manufacturing, and distribution facilities are located throughout the city, primarily along Sunrise Boulevard, Jackson Highway (SR 16), Bradshaw Road, and Folsom Boulevard. The Aerojet General Corporation operations are located south of U.S. 50 and east of Sunrise Boulevard. Teichert and Granite have active mining operations north of SR 16 between Bradshaw Road and Excelsior Road and Teichert also has operations south of U.S. 50 along Grant Line Road. The most southern portion of the city (i.e., south of SR 16) is characterized with rural residential, agricultural operations, and industrial land uses. (City of Ranch Cordova 2006:4.1-4.)

The SACOG Blueprint Preferred Scenario anticipates an additional 112,000 households and 144,000 jobs in Rancho Cordova between 2000 and 2050. The Blueprint assumes Rancho Cordova would have a population of over 332,000 people by 2050 and a fairly even mixture of jobs and housing and this growth would occur through development on underutilized lands along and near Folsom Boulevard and lands inside the current USB. Housing is expected to be primarily single-family detached homes plus multi-family units (attached rowhouses, townhomes, condominiums, and apartments) to ensure housing for the growing population and work force (SACOG and Valley Vision 2004a). The city population has grown from 48,731 in 1990 to 53,065 in 2000 (U.S. Census Bureau 2000b), and the population of the City as of January 1, 2009, was estimated to be 61,817 (DOF 2009b).

GEOGRAPHIC SCOPE

The geographic area that could be affected by the project varies depending on the type of environmental resource or issue area being considered. When the impacts of the project are considered in combination with other past, present, and future projects to identify cumulative impacts, the other projects considered may also vary depending on the type of environmental impacts being assessed. The general geographic area associated with different environmental impacts of the project defines the boundaries of the area used for compiling the list of projects considered in the cumulative impact analysis. Table 3.0-1 presents the general geographic areas and time frames associated with the different resources addressed in this EIR/EIS cumulative analysis.

Table 3.0-1
Geographic Scope and Time Frame of Cumulative Impacts

Resource Issue	Geographic Area	Time Frame
Aesthetics	Sacramento County and the City of Rancho Cordova	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Air Quality	Sacramento Federal Ozone Nonattainment Area (includes Sacramento County, Yolo County, the western portion of El Dorado County, and portions of Placer and Solano Counties)	Federal and state regulations and policies generally result in incremental improvements or degradation of regional air quality over a long time period, consistent with full build-out of currently approved County and City General Plans in 20 to 30 years
Biological Resources	Laguna Creek and Morrison Creek watersheds	Losses of vernal pools in the Central Valley began at the onset of expanded European settlement during and after the 1849 gold rush in California. Therefore, the starting point of the analysis is the mid-1800s through full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Climate Change	Global, regional, and local (SPA and vicinity)	Federal and state regulations and policies generally result in incremental improvements or degradation of global climate change over a long time period, consistent with full build-out of currently approved County and City General Plans in 20 to 30 years
Cultural Resources	SPA and Sacramento Region	Losses of cultural resources in the Central Valley began at the onset of expanded European settlement during and after the 1849 gold rush in California. Therefore, the starting point of the analysis is the mid-1800s through Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Environmental Justice	City of Rancho Cordova and Sacramento County	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years

Table 3.0-1
Geographic Scope and Time Frame of Cumulative Impacts

Resource Issue	Geographic Area	Time Frame
Geology, Soils, and Mineral Resources	SPA and immediate vicinity	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Hazards and Hazardous Materials	SPA and nearby roadways	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Hydrology and Water Quality	South American Groundwater Subbasin, Kite Creek, Laguna Creek, Morrison Creek, Beach Lake, Stone Lake, Sacramento River, and Blodgett Reservoir	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Land Use and Agricultural Resources	Development identified in eastern Sacramento County and the City of Rancho Cordova	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Noise	Immediate project vicinity where effects are localized	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Parks and Recreation	Eastern Sacramento County regional and local facilities	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Population, Employment, and Housing	Sacramento region, including Sacramento County and the City of Rancho Cordova	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Public Services	Sacramento Metropolitan Fire Department, City of Rancho Cordova Police Department, and Folsom Cordova Unified School District	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Traffic and Transportation	Regional and local facilities	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Utilities and Service Systems	Sacramento Regional County Sanitation District, Sacramento Regional Wastewater Treatment Plant, Sacramento Metropolitan Utility District, Kiefer Landfill, PG&E, AT&T, SMUD, and Comcast	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years
Water Supply	Sacramento County Water Agency Zone 40 2030 Study Area	Full buildout of the City of Rancho Cordova General Plan from 2006 over the next 20-30 years

Notes: SMUD = Sacramento Municipal Utility District; PG&E = Pacific Gas & Electric Company
Source: Data compiled by AECOM in 2010

List of Related Projects

The list of past, present, and probable future projects used for this cumulative analysis is restricted to major development projects in eastern Sacramento County and the City of Rancho Cordova. The projects listed in Table 3.0-2 and depicted in Exhibit 3.0-1 are not intended to be an all-inclusive list of projects in the region, but rather an identification of larger projects approved or planned in eastern Sacramento County and the City of Rancho Cordova that may affect the same resources as the SunCreek Specific Plan project.

In addition to the residential/commercial projects listed in Table 3.0-2, the other projects discussed below are also considered to be “related projects” for purposes of this cumulative analysis.

Table 3.0-2 Related Residential/Commercial Projects in Eastern Sacramento County and the City of Rancho Cordova						
Map Key	**Development**	**Type of Development**	**Residential Acreage**	**Commercial Acreage**	**Units**	**Current Status**
1	Easton Place at Easton	Residential, Commercial	68	213	1,500	Approved
2	Westborough at Easton	Residential	820	N/A	5,100	Approved
3	Glenborough at Easton	Residential	524	N/A	3,390	Approved
4	Capital Village	Residential, Commercial	71.1	32	827	Under Construction
5	Villages at Zinfandel	Residential, Commercial	527	18	1,833	Under Construction
6	Rio del Oro	Residential, Commercial, Industrial, Recreation, Schools, Open Space	1,920	521	11,601	Approved
7	North Douglas II	Low Density Residential, Open Space	41.5	N/A	153	Pending Approval
8	North Douglas I	Low Density Residential/Park	120.9	N/A	666	Approved
9	Mather East	Commercial, Multi-Family Open Space	11.9	29.1	129	Approved
10	Anatolia I	Residential, Commercial, Recreational, Schools	163.5	14.5	916	Under Construction
11	Anatolia II	Residential, Commercial, Recreational, Schools	150.7	11.1	980	Under Construction
12	Anatolia III	Low Density Residential, Open Space	208	N/A	798	Site Preparation and Grading
13	Anatolia IV	Residential	25	N/A	203	Pending Approval
14	Montelena	Residential, Wetland Preserve, Recreational, Fire Station	158.3	N/A	892	Approved
15	Sunridge Lot J	Residential/Open Space	64.8	N/A	369	Pending Approval
16	Sunridge Park	Low Density Residential	203.4	32.3	953	Awaiting final maps
17, 18, 19, 21	Douglas 103, Douglas 98, Grantline 208, and Arista Del Sol	Residential, Commercial, Office, and Natural Preserve	363.7	24	2,504	Proposed
18	The Ranch at Sunridge (formerly The Preserve)	Residential, Village Center, Parks, Wetland Preserve	303.5	N/A	2,681	Under CEQA Review
23	Excelsior Estates	Residential	N/A	N/A	N/A	Proposed
24	Arboretum	Residential, Parks, Schools, Commercial	616	44.5	5,002	Under CEQA Review
25	Cordova Hills	University Campus, Residential, Commercial, Open Space	942	189	9,010	Proposed
26	Heritage Falls	Residential, schools, commercial	173	N/A	960	Proposed

Table 3.0-2 Related Residential/Commercial Projects in Eastern Sacramento County and the City of Rancho Cordova						
Map Key	**Development**	**Type of Development**	**Residential Acreage**	**Commercial Acreage**	**Units**	**Current Status**
27	Folsom South of US Highway 50	Residential, Commercial, Open Space	1,477	363	10,210	Under CEQA Review
32	Kiefer Landfill Special Planning Area[1]	Landfill, Habitat Preserve, Industrial	N/A	N/A	N/A	NOP Issued

Notes: N/A = not applicable or data not available.
[1] The Kiefer Special Planning Area would include land use designations of General Agriculture, Public & Quasi Public, and a Waste Stream Industry District. Teichert Quarry, Stoneridge Quarry, DeSilva Gates Quarry, and Sacramento GreenCycle, are described in text below.
Source: City of Rancho Cordova 2010; Sacramento County 2010a; Sacramento County 2010b

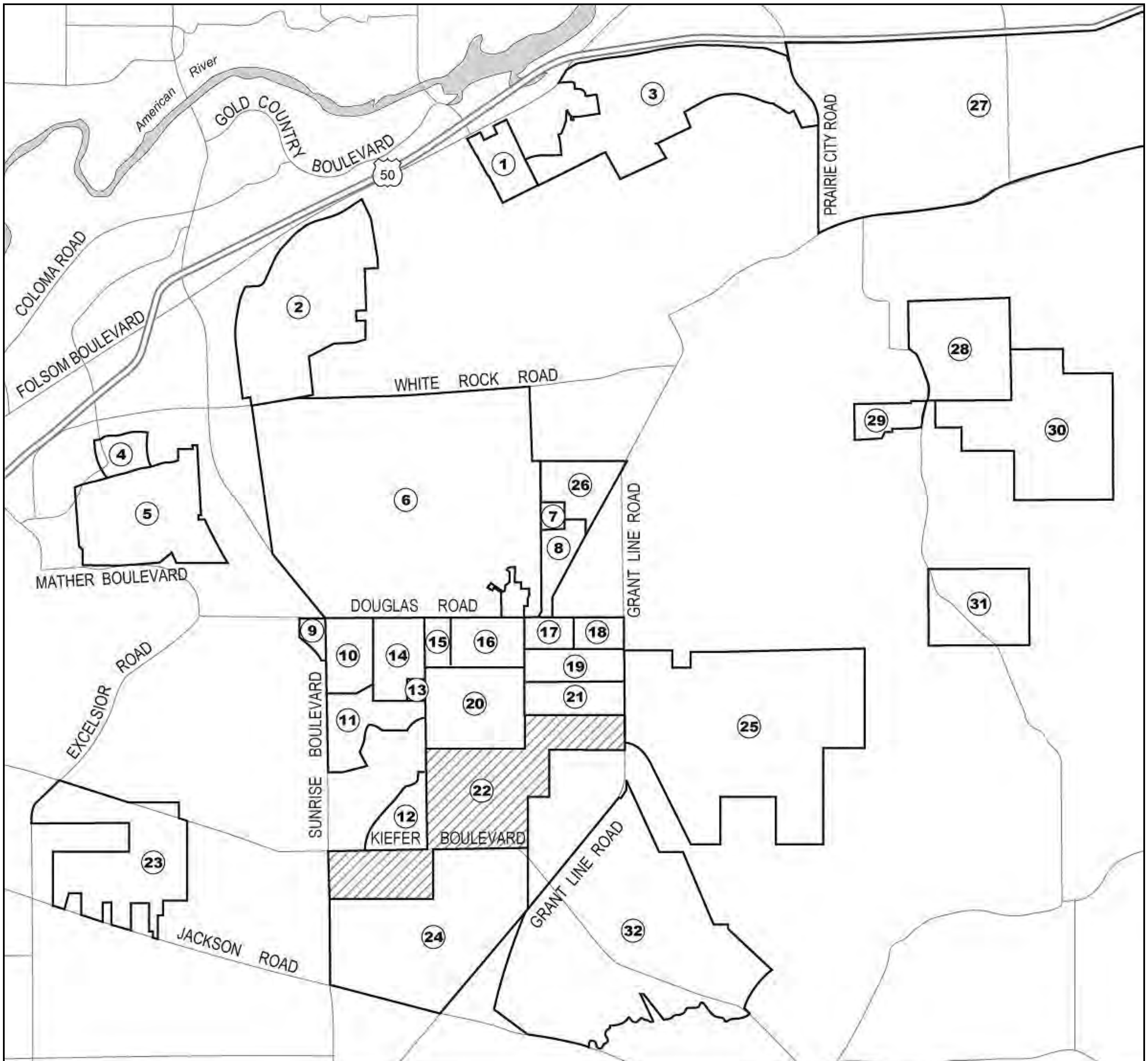
Teichert Quarry

The proposed Teichert Quarry would be located approximately 5 miles northeast of the SPA in Sacramento County, south of White Rock Road, east of Grant Line Road, and west of Scott Road. The Teichert Quarry project would be located on approximately 380 acres of the 580-acre site and would include construction of an aggregate processing facility, administration complex, parking areas, on-site access road, and various other stockpiles and processing areas. The Teichert Quarry project includes construction of a public access road for ingress/egress to the property that would extend from the entrance/exit of the property north approximately one mile to White Rock Road.

The maximum proposed annual aggregate production during the life of the quarry would be 7 million tons per year. A maximum of 6 million tons per year would be distributed directly from the quarry site on haul trucks using the proposed access road. A maximum of 3 million tons and a minimum of 1 million tons per year would be conveyed to the existing Grant Line facility for further processing and sale. Mining would continue for up to 25 years through two mining phases. A total of about 135 million tons of material would be mined over the life of the quarry. At the conclusion of aggregate production, a two- to four-year final reclamation phase would extend the total project lifespan to 27 to 29 years.

The DEIR for the Teichert Quarry Project was released on August 22, 2008. The requested entitlements for the Teichert Quarry project are the following: a General Plan Amendment and rezoning, a use permit, a grading permit, a reclamation plan, an encroachment permit, and a development agreement (Sacramento County 2008). As described in the Teichert Quarry Project DEIR, construction and operation of the quarry would result in a number of environmental impacts, most of which would be reduced to a less-than-significant level through implementation of mitigation measures. Significant and unavoidable impacts associated with the quarry would include: adverse effects on a scenic vista; degradation of the existing visual character of the site and its surroundings; introduction of new sources of substantial light or glare; long-term increases in reactive organic gases (ROG) and oxides of nitrogen (NO_X); increases in traffic from deterioration of levels of service below acceptable levels at roadways or intersections operating at an acceptable level, increases in the volume to capacity ratio at roadways not operating at an acceptable levels of service, and increases in delay by more than five seconds at unsignalized intersections; and potential increases in accidents between haul trucks and cars.

The Teichert Quarry project DEIR includes the following cumulatively significant and unavoidable impacts: alteration of the visual character of the SPA and visual incompatibility with surrounding land uses in the vicinity of the SPA; introduction of new sources of substantial light or glare in the vicinity of the SPA; conversion of agricultural lands to nonagricultural uses; long-term degradation of regional air quality; cumulative impacts on biological resources from buildout of Sacramento County; increases in traffic from deterioration of levels of service below acceptable levels at roadways or intersections operating at an acceptable levels, increases in the volume to capacity ratio at roadways not operating at an acceptable levels of service, increases in density on a



LEGEND

1. Easton Place at Easton
2. Westborough at Easton
3. Glenborough at Easton
4. Capital Village
5. Villages of Zinfandel
6. Rio del Oro
7. North Douglas II
8. North Douglas I
9. Mather East
10. Anatolia I
11. Anatolia II
12. Anatolia III
13. Anatolia IV
14. Montelena
15. SunRidge Lot J
16. SunRidge Park
17. Douglas 103
18. Douglas 98
19. Grantline 208
20. The Ranch at Sunridge
21. Arista Del Sol
22. SunCreek
23. Excelsior Estates
24. Arboretum
25. Cordova Hills
26. Heritage Falls
27. Folsom South of US Highway 50
28. Teichert Quarry
29. Sacramento GreenCycle
30. Stoneridge Quarry
31. DeSilva Gates Quarry
32. Kiefer Landfill Special Planning Area

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Sources: City of Rancho Cordova 2010; Sacramento County 2010a, 2010b, 2010c; data adapted by AECOM in 2012

Map of the Related Projects **Exhibit 3.0-1**

segment of U.S. 50 operating at unacceptable levels of service without the Teichert project, and increases in delay by more than five seconds at unsignalized intersections; increases in accidents between haul trucks and cars; and increases in greenhouse gas emissions (Sacramento County 2008).

The FEIR for the Teichert Quarry Project was released on October 1, 2010. The General Plan Amendment requested as part of the project was approved on October 27, 2010. The remaining portions of the project were approved by the County Board of Supervisors on November 30, 2010, with the condition that the East Sacramento Regional Aggregate Mining Truck Management Plan, which will be subject to separate CEQA analysis, must be prepared with the involvement of various parties concerned in quarry truck routing.

Stoneridge Quarry

The proposed Stoneridge Quarry project would be located south of White Rock Road and east of Scott Road approximately 5 miles northeast of the SPA. The quarry site is approximately 1,360 acres in size and the active mining and processing area would be approximately 613 acres. The quarry project includes a new access road on an existing right of way that would extend from the quarry property north to White Rock Road. The quarry project would generally involve excavation and processing of hard rock aggregate. The project includes a request for a 100-year mining permit with a maximum annual production rate of 6 million tons. The mining would result in an open pit averaging 350 feet deep. The proposed reclamation plan for the Stoneridge Quarry project anticipates a lake in the mining pit as the end use, with a return to seasonal grazing on the other areas of the site. (Sacramento County 2007a:NOP-2.)

An NOP for the proposed Stoneridge Quarry project was prepared by Sacramento County and circulated for public review in December 2007. The requested entitlements for the Stoneridge project are the following: a General Plan Amendment and rezoning, a use permit to allow quarry mining and processing of materials, a reclamation plan, an encroachment permit, and a development agreement (Sacramento County 2007a:NOP-3). Potentially significant environmental impacts associated with development of this site, as identified in the Stoneridge Quarry project NOP, include impacts on land use, traffic, air quality, drainage and hydrology, water quality, biological resources, noise, geology, aesthetics, and cultural resources.

DeSilva Gates Quarry

The proposed DeSilva Gates Quarry site is located approximately 3 miles northeast of the SPA near the eastern Sacramento County line. Hard rock mining and reclamation would occur on approximately 480 acres within the 3,000-acre Barton Ranch property. Mining permits would allow for up to 6 million tons of rock aggregate production per year over 100 years (Sacramento County 2007b). The City and USACE understand that DeSilva-Gates has withdrawn its application for this project; however, to be conservative for purposes of this analysis, it is assumed that the DeSilva-Gates quarry project will still go forward in the future with a different project applicant. Therefore, this quarry project is included in this cumulative analysis.

An NOP for the proposed DeSilva Gates Quarry project was prepared by Sacramento County and circulated for public review in January 2008. The requested entitlements for the DeSilva Gates Quarry project are the following: a General Plan amendment and rezoning, a use permit to allow quarry mining and processing of materials, a reclamation plan, an encroachment permit, and a development agreement (Sacramento County 2007b). Potentially significant environmental impacts associated with development of this site, as identified in the DeSilva Gates Quarry project NOP, include impacts on land use, traffic, air quality, drainage and hydrology, water quality, biological resources, noise, geology, aesthetics, and cultural resources (Sacramento County 2007b). Although it is assumed that a different quarry project applicant will come forward in the future, it is reasonably forseeable that the same types of impacts identified in the NOP discussed above would occur regardless of which entity were operating the quarry project.

Sacramento GreenCycle

Sacramento GreenCycle is planned to be a garden refuse processing project that is sited approximately 3 miles northeast of the SPA. The project would include construction and operation of a facility that would accept and process up to 600 tons per day of green waste from residential green refuse. A DEIR was issued for this project on October 21, 2009 and the EIR was certified in March 2010, 30 days after release of the FEIR. The EIR disclosed that implementation of the Sacramento GreenCycle project would result in significant and unavoidable impacts to land use, aesthetics, agricultural resources, traffic and circulation, air quality, odors, hydrology/flooding, and biological resources (Sacramento County 2009b).

REGIONAL PLANNING ENVIRONMENT

The regional cumulative analysis area covers the incorporated and unincorporated areas of Sacramento County and the City of Rancho Cordova. This analysis includes information from the Sacramento County General Plan (Sacramento County 1993), the City of Rancho Cordova General Plan (2006), and the SACOG Sacramento Region Blueprint and Preferred Blueprint Scenario (SACOG and Valley Vision 2004a). A summary of the cumulative planning environment in Sacramento County and the City of Rancho Cordova that is used for the regional cumulative impact analysis is provided below.

Sacramento County General Plan

The *Sacramento County General Plan of 2005–2030* was adopted by the County Board of Supervisors on November 9, 2011. The Sacramento County General Plan update has a planning horizon of 2030, which is consistent with the planning horizons of SACOG's Sacramento Region Blueprint. The Sacramento County General Plan contains objectives and policies that are intended to guide the County toward a more compact urban character by concentrating growth within existing urbanized areas and revitalizing aging commercial corridors and strategically located new growth areas, thereby using land resources as efficiently as possible, and includes strategies to reduce greenhouse gas emissions consistent with State law.

Portions of the Sacramento County General Plan contain policies for urban development including urban communities and the infrastructure necessary to serve them. Other sections of the Sacramento County General Plan describe strategies to recognize and preserve areas of open space and natural resources. As a whole, the general plan reflects a balance between the amount and location of land uses in urban areas and those to remain in a rural or natural setting.

Community plans reflect the goals and policies of individual communities and guide land use and development of specific communities on a more detailed basis than the general plan. Sacramento County has adopted the following community plans: Antelope, Arden-Arcade, Carmichael, Cordova, Delta, Fair Oaks, North Highlands/Foothill Farms, Orangevale, Rio Linda/Elverta, Southeast, South Sacramento, and Vineyard. Specific plans are detailed policy plans that identify allowable land uses and infrastructure needs for a specific geographic area and are most often used to comprehensively plan for development of new growth areas. Sacramento County has adopted the following specific plans: East Antelope, Elverta, Mather, and North Vineyard Station, Easton, and Vineyard Springs (Sacramento County 2010d).

In addition to community and specific plans, the Sacramento County General Plan identifies Commercial Corridor Plans that focus on planning for future improvements within specified commercial and transportation corridors on a more detailed basis than the general plan; Special Planning Areas that impose a "special" set of development standards for select areas that have unique qualities; and Neighborhood Preservation Areas, which are special zoning regulations that are adopted to preserve the unique qualities and characteristics of a neighborhood.

The Sacramento County General Plan designates two boundaries that guide policies for growth within the county. The USB is the boundary of the urban area in the unincorporated County. It is a permanent boundary that will not be modified except under extraordinary circumstances and will be used as a planning tool for urban infrastructure providers for developing very long-range master plans that would accompany future urbanization (Sacramento County 2009a).

The Urban Policy Area (UPA) defines the area expected to receive urban levels of public infrastructure and services within the 20-year planning period of the Sacramento County General Plan. The UPA provides the geographic basis for infrastructure master plans, particularly for public water and sewage, which require large capital investments and relatively long lead times for the installation of capital improvements (Sacramento County 2009a).

City of Rancho Cordova General Plan

The City of Rancho Cordova General Plan serves as a compass to guide planners, the general public, and decision makers on the desired pattern of development in Rancho Cordova. It describes both existing and future land use activity, the latter of which was designed to achieve the city's long-range goals for physical development. The General Plan identifies the distribution, location, and intensity of all land use types throughout the city.

Sacramento Area Council of Governments Sacramento Region Blueprint

The SACOG Sacramento Region Blueprint depicts a way for the region to grow through the year 2050 as the current population of 2 million increases to more than 3.8 million, the number of jobs increases from 921,000 to 1.9 million, and the amount of housing increases from 713,000 to 1.5 million units (inclusive of the development described above). In December 2004 the SACOG Board of Directors adopted the Preferred Blueprint Scenario, a vision for growth that promotes compact, mixed-use development and more transit choices as an alternative to low-density development. The Preferred Blueprint Scenario predicts that undertaking a realistic long-term planning process will result in long-term environmental benefits and avoidance of impacts; these benefits are intended to minimize the extent of the inevitable physical expansion of the overall regional urban area. As a result, natural resources that might be lost under a traditional approach would be protected because less land would be required for urban uses and less agricultural land would be converted. In addition, the Preferred Blueprint Scenario predicts less time per person devoted to travel, fewer car trips, and fewer miles traveled to work and local businesses. The reduction in traffic compared with what would occur under traditional patterns would lead to long-term reductions in air quality emissions in the region by reducing the amounts of vehicular carbon monoxide (CO) and particulate matter that would otherwise be emitted under traditional, lower density development patterns (SACOG and Valley Vision 2004b).

Although it is only advisory, the Blueprint is the most authoritative regional policy guidance in the Sacramento region for long-term regional land use and transportation planning. As stated in the City General Plan, land uses in Rancho Cordova generally reflect the types and intensity of land uses shown in the Preferred Blueprint Scenario, which envisions relatively higher overall residential densities than currently in place. This land use scenario does not establish "buildout targets" but anticipates the addition of approximately 54,000–60,000 new households and 48,000 new jobs in the current Rancho Cordova city limits (based on assumptions used in the Blueprint process), with possible additional growth in the planning area.

ANALYSIS OF CUMULATIVE IMPACTS

The cumulative impacts anticipated to result from implementation of the SunCreek Specific Plan project, together with the related projects and regional development, are evaluated in this EIR/EIS within each of the 17 environmental issue areas (i.e., Sections 3.1 through 3.17) of Chapter 3. The analysis conforms with CCR Section 15130 of the State CEQA Guidelines, which specifies that the "discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a detail as is provided of the effects attributable to the project alone." The CEQ (1997) provides for a similar approach. Cumulative impact discussions are provided after the analysis of project-specific impacts for each resource section.

The cumulative impacts of implementing the Proposed Project or any of the other four action alternatives would be substantially similar; therefore, this cumulative analysis uses the term “project” to refer to all of the action alternatives. There would be no cumulative impacts from adoption of the No Project Alternative, because no development would occur.

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3.1 AESTHETICS

3.1.1 AFFECTED ENVIRONMENT

Visual resources are the natural and artificial features of the landscape that can be seen and that contribute to the public's appreciative enjoyment of the environment. Visual resources or aesthetic impacts are generally defined in terms of a project's physical characteristics and potential visibility, and the extent to which the project's presence would change the perceived visual character and quality of the environment in which it would be located. Exhibit 3.1-1 provides photographs of representative views of the SPA and surrounding area taken during site visits on June 7, 2007, July 30, 2010, and September 19, 2010, and Exhibit 3.1-2 shows the locations where the photographs were taken.

VISUAL ASSESSMENT AND VISUAL QUALITY CRITERIA

The aesthetic quality of an area is determined through the variety and contrasts of the area's visual features, the character of those features, and the scope and scale of the scene. The aesthetic quality of an area depends on the relationships between its features and their importance in the overall view. Evaluating scenic resources requires a method that characterizes visual features, assesses their quality in relation to the visual character of the surrounding area, and identifies their importance to the individuals viewing them. This process is derived from established procedures for visual assessment developed by Federal agencies, and is commonly used for a variety of project types.

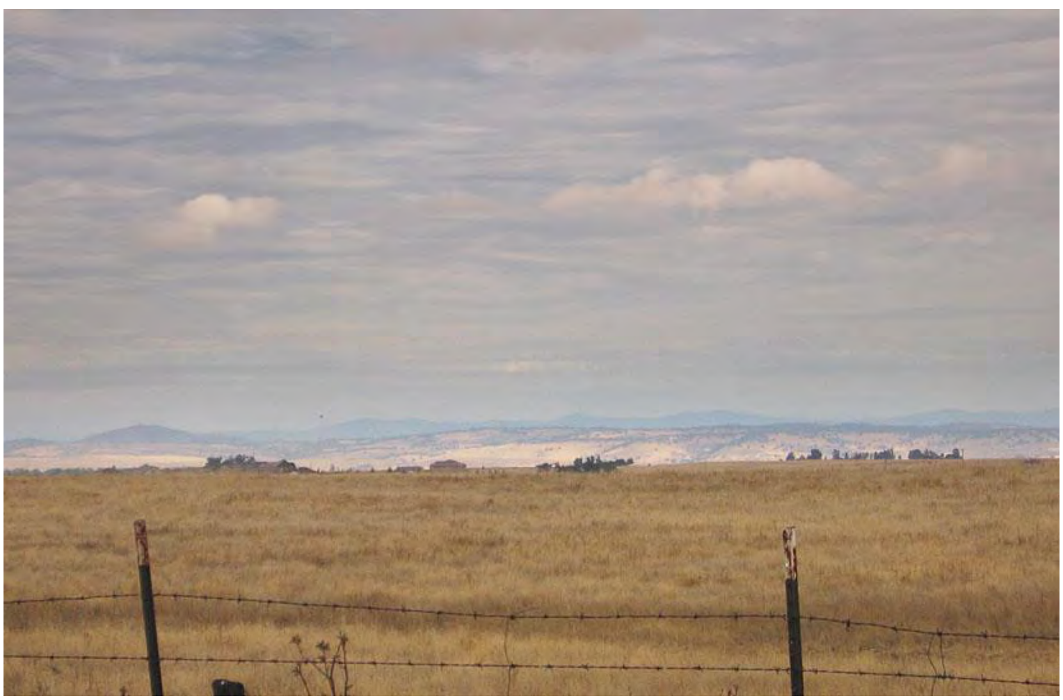
Both natural and created features in a landscape contribute to its visual quality. Landscape characteristics influencing visual quality include geologic, hydrologic, botanical, wildlife, recreation, and urban features. Several sets of criteria have been developed for defining and evaluating visual quality. The criteria developed by the Federal Highway Administration in 1981, which are used in this analysis, include the concepts of vividness, intactness, and unity. According to these criteria, none of these is itself equivalent to visual quality; all three must be considered high to indicate high quality. These terms are defined as follows:

- "Vividness" is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- "Intactness" is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements.
- "Unity" is the visual coherence and compositional harmony of the landscape considered as a whole.

The analysis of visual resources for this project uses a qualitative approach for characterizing and evaluating the visual resources of the areas that could be affected by the project. The quality of views of areas that could be affected by the project is evaluated based on the relative degree of vividness, intactness, and unity apparent in views. Viewer sensitivity, also considered in relation to these criteria, is a function of several factors, including the following:

- visibility of the landscape,
- proximity of viewers to the visual resources,
- frequency and duration of views,
- number of viewers,
- types of individuals and groups of viewers, and
- viewers' expectations as influenced by their activity.

Viewpoint 1: View from the central portion of the SPA along Kiefer Boulevard toward Rancho Cordova Parkway. Power poles and scattered trees are visible in the background, and the Anatolia development and a culvert for Kite Creek are visible in the middleground.



Viewpoint 2: View from the southwestern edge of the SPA to the northeast. The Sierra Nevada mountains and foothills are clearly visible in the background.

Representative Photographs **Exhibit 3.1-1a**

Viewpoint 3: View from Sunrise Boulevard looking southwest from the approximate location of the proposed Crescent Drive. Quarry operations at Triangle Rock Products are clearly visible in the middleground.

Viewpoint 4: View from Sunrise Boulevard looking northwest from the approximate location of the proposed Crescent Drive. The Sacramento County Rendering Plant, located west of the intersection of Sunrise Boulevard and Kiefer Boulevard, is visible in the middleground.

Representative Photographs **Exhibit 3.1-1b**

Viewpoint 5: View of a portion of Blodgett Reservoir (located on the Arboretum project site) from the southern edge of the SPA, near the intersection of Kiefer Boulevard and the proposed Americanos Boulevard.

Viewpoint 6: View off-site to the southeast along Kiefer Boulevard at the approximate location of the proposed Americanos Boulevard. The building to the left of the photograph in the background is associated with Kiefer Landfill. A portion of Blodgett Reservoir runs below the bridge located in the middleground of the photograph.

Representative Photographs **Exhibit 3.1-1c**

Viewpoint 7: View of a pond on the eastern edge of the SPA. Note the vegetation on the right side of the photo, and general rural appearance in the middleground and background.

Viewpoint 8: View of a vernal pool in bloom, located near the eastern edge of the SPA.

Representative Photographs **Exhibit 3.1-1d**

Viewpoint 9: View of the central portion of the SPA from the Kite Creek culvert located on Rancho Cordova Parkway, looking east. Note the Kite Creek (i.e., Sun Creek) creek bed in foreground, scattered trees in the middleground, and the Sierra Nevada foothills in the background.

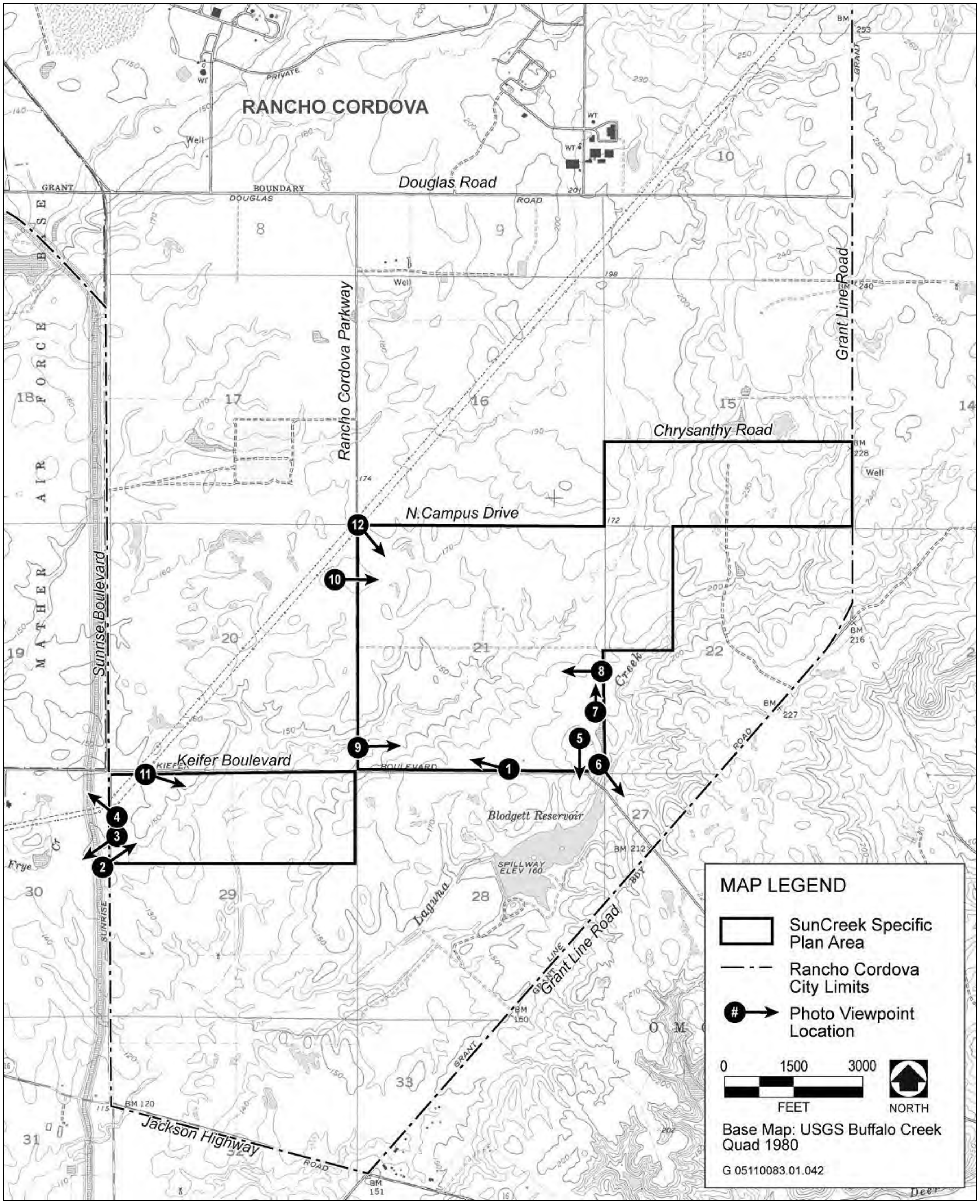
Viewpoint 10: View to the northeast from the intersection of North Campus Drive and Rancho Cordova Parkway.

Representative Photographs **Exhibit 3.1-1e**

Viewpoint 11: View of the SPA along Kiefer Boulevard, near the Sunrise Boulevard Intersection, looking southeast.

Viewpoint 12: View looking southeast from the intersection of North Campus Drive and Rancho Cordova Parkway into the central portion of the SPA. Note the dried creek bed in the middleground and scattered trees in the background.

Representative Photographs **Exhibit 3.1-1f**



Source: Data Compiled by AECOM in 2010

Viewpoint Locations **Exhibit 3.1-2**

The viewer's distance from landscape elements plays an important role in the determination of an area's visual quality. Landscape elements are considered higher or lower in visual importance based on their proximity to the viewer. Generally, the closer a resource is to the viewer, the more dominant, and therefore visually important, it is to the viewer. The U.S. Forest Service (USFS) methodology, which separates landscapes into foreground, middleground, and background views, has been used in this analysis. Although these three classifications should be considered on a case-by-case basis, in general, the foreground is characterized by clear details (within 0.25 or 0.5 mile from the viewer); the middleground is characterized by loss of clear texture within a landscape creating a uniform appearance (foreground to 3–5 miles in the distance); and the background extends from the middleground to the limit of human sight (USFS 1974).

REGIONAL SETTING

The various components of the SunCreek Specific Plan would be developed within the city limits of Rancho Cordova, which is located on the eastern edge of the Sacramento Valley. The SunCreek Specific Plan Area is bounded by Grant Line Road to the east and Sunrise Boulevard to the west, and is located within the Sunrise Douglas Community Plan area. Most of the SPA is undeveloped land used sporadically for dry land farming and grazing on spring grasses. Nearby land uses include the Anatolia development under construction to the west (Viewpoint 1) and generally undeveloped land to the north, east, and south (Viewpoint 2). Industry located adjacent to the SPA includes quarry activities to the southwest (Viewpoint 3); and the Sacramento County Rendering Plant to the west (Viewpoint 4). Blodgett Reservoir is located south of the SPA (Viewpoint 5), and Kiefer Landfill is located southeast of the SPA (Viewpoint 6). In addition to the SunCreek Specific Plan, various developments are planned for surrounding lands. Proposed projects to the north of the SPA include Anatolia III, the Ranch at Sunridge, and Arista Del Sol. The Arboretum Specific Plan area is located to the south, and would be bounded by Sunrise Boulevard to the west, Jackson Highway to the south, Kiefer Road to the north, and Grant Line Road to the east. The Cordova Hills development is proposed on the east side of the SPA (on the east side of Grant Line Road in Sacramento County). The Kiefer Landfill Special Planning area is located southeast of the project, and is planned to be used as a habitat preserve in areas surrounding the landfill. For more information related to surrounding development, see Section 3, "Chapter Organization, Introduction to Analysis, and Cumulative Context."

VISUAL CHARACTER OF THE SPA AND IMMEDIATE VICINITY

The SunCreek SPA includes approximately 1,253 acres and consists of undeveloped grasslands that contain very little topographic variation; seasonal wetlands and drainages (Exhibit 3.1-1, Viewpoints 7, 8, and 9), including Kite Creek; and a few scattered trees (Exhibit 3.1-1, Viewpoints 3, 4, and 5). Prominent features of the SPA are limited to Kite Creek, a few residences, a few scattered trees, barbed-wire fencing, and utility towers (Exhibit 3.1-1, Viewpoints 10, 11, 12). In the background, on clear days, the Sierra Nevada mountain range is visible to the east and Mount Diablo is visible to the southwest. As described below, the vividness, unity, and intactness are considered to be of high value.

Housing developments are currently under construction to the north and west of the SPA (Exhibit 3.1-1, Viewpoint 3), while views to the south and west are undeveloped and contain similar characteristics as the SPA. Blodgett Reservoir which is used for recreational purposes, is located directly south of the SPA (Exhibit 3.1-1, Viewpoint 4).

VISUAL ASSESSMENT OF THE PROJECT SITE

- **Vividness:** The SPA is characterized by a relatively flat area covered with annual grasses and a few scattered trees. There are relatively few encroachments on site, consisting of barbed-wire fencing, utility lines, and a few scattered rural residences. These items do not constitute a substantial distraction to the landscape as a whole. While views to the west and north are blocked by housing developments, views to the south and east are generally undeveloped. Certain vantage points in this area offer a rare opportunity to view undisturbed open space with a clear view of the Sacramento Valley to the south, and the undeveloped foothills of the Sierra Nevada foothills and mountains to the east.

- **Intactness:** As described above, few encroachments exist on site. The majority of this area provides views of undeveloped grasslands, which most people consider to be aesthetically pleasing. Because the SPA is generally undisturbed, the SPA is considered to have a highly intact landscape.

- **Unity:** The SPA is exemplary of California's Central Valley rangeland, including gently rolling hills, which contrasts with development in the area. Although there are a few encroachments within the SPA, they are few in number and do not detract from the overall sense of unity.

Viewer Sensitivity

As described above, viewer sensitivity is related to the values and opinions of a particular group and can be generally characterized by the viewer activity, awareness, and local significance of a site. Viewers of the SPA include travelers along Sunrise Boulevard, Grant Line Road, and Kiefer Boulevard, and residents living in adjacent developments to the west and north. In general, motorists in the area are driving past the site on Grant Line Road to use Kiefer Landfill (located southeast of the SPA), or to nearby homes (in the Anatolia development west of Rancho Cordova Parkway) and businesses along Sunrise Boulevard. In addition, the section of Sunrise Boulevard that borders the SPA is a Special Sign Corridor, which places design restrictions on signs within 500 feet of the roadway. The existence of such a regulation indicates that the aesthetics of this area are appreciated and an attempt has been made to keep them intact. Furthermore, the SPA provides a view of a generally undisturbed rural landscape, which has become an increasingly rare site in the areas surrounding the SPA. Thus, viewer sensitivity is considered to be high.

3.1.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No Federal plans, policies, regulations, or laws are applicable to the Proposed Project or alternatives under consideration.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Department of Transportation

The California Department of Transportation (Caltrans) manages the California Scenic Highway Program. The goal of the program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to designated highways. However, there are no state-designated scenic highways in the vicinity of the SPA (Caltrans 2008).

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

City of Rancho Cordova General Plan

Goals and policies from the *City of Rancho Cordova General Plan* (City General Plan 2006) relating to aesthetics that are applicable to the Proposed Project and alternatives under consideration are listed in Appendix K.

City of Rancho Cordova Lighting Standards

Title 1 (General Provisions) of the City of Rancho Cordova Zoning Code contains standards requiring that illumination of buildings, landscaping, signs, and parking and loading areas be shielded and directed so that no light trespasses onto adjacent properties. Title III (Use Regulations and Development Standards) requires that lighting shall be directed away from residential areas and public streets so that glare is not produced that could impact the general safety of vehicular traffic and the privacy and well-being of residents.

City of Rancho Cordova Design Guidelines

On September 6, 2005, the Rancho Cordova City Council adopted the City's first comprehensive Design Guidelines document (Resolution 108-2005) (City of Rancho Cordova 2005). The Design Guidelines apply to all types of development and reflect the City's desire for quality development. The Design Guidelines were created using input and direction from Urban Design workshops held in the spring/summer of 2004, the visual preference survey and General Plan survey conducted in the summer of 2004, visioning workshops and land use map discussions for the City's General Plan, and the guiding principles of the City's Design Review Ordinance. These provisions provide a framework to evaluate new development projects against the City's adopted vision and are intended to reflect the City's desires relative to land planning, as well as individual site design and architecture. The guidelines and standards set forth in Chapter 2 of the Design Guidelines, "Community Design," are applicable to all project types and cover a wide range of topics from general circulation and project signage to landscaping and sustainable development. The subsequent chapters provide additional provisions that are applicable to unique project types, including commercial and commercial mixed use, office and office mixed use, residential (all types from single family detached to residential mixed use), community facilities, and industrial. The determination of whether a project is consistent with the overall intent of the guidelines ultimately rests with the designated Approving Authority.

Specific Design Guidelines that are related to visual resources potentially affected by development of the site include the following:

Site Design – Screening and Service Areas

Design Objective: Screen on-site activities that detract from overall appearance of the site or otherwise create undesirable noise.

Design Guidelines:

- Appropriate locations for loading, outdoor storage, refuse collection shall be located behind buildings or in areas not designated for pedestrians or as primary vehicular circulation routes through the site.
- Screening of service functions shall be incorporated into overall design of buildings and landscaping.
- Rooftop equipment shall be entirely screened from public view.

Site Design – Sustainable Development

Design Objective: Preserve and protect natural features of the environment.

Design Guideline:

- Significant natural features from the environment shall be included in all new development. This can include the use of native plantings and restoration and protection of creeks, swales, and vernal pools.

Architecture – Massing, Scale, Form

Design Objective: Design buildings at a human scale to ensure a desirable pedestrian environment with variety and visual richness that enhances the public realm and the pedestrian experience.

Design Guidelines:

- Large building volume should be broken into a number of smaller components to decrease its apparent mass and volume, to thus reduce visual impacts.
- Large buildings should tier or taper to reduce their scale along the edges of the site.

Proposed SunCreek Specific Plan Development Regulations

Section 2.12.7, "General Lighting Standards" of the proposed SunCreek Specific Plan (attached as Appendix C to this DEIR/DEIS) Development Regulations provide the following guidance for light installations.

A. Nuisance Prevention

All outdoor lighting shall be designed, located, installed, directed downward or toward structures, shielded, and maintained in order to prevent glare, light trespass, and light pollution.

B. Maintenance

Fixtures and lighting shall be maintained in good working order and in a manner that serves the original design intent.

C. Shielding

Except as otherwise exempt, all outdoor lighting shall be constructed with full shielding and/or recessed to reduce light trespass to adjoining properties. Each fixture shall be directed downward and away from adjoining properties and public rights-of-way, so that no light fixture directly illuminates an area outside of the site.

D. Level of Illumination

Outdoor lighting shall be designed to illuminate at the minimum level necessary for safety and security and to avoid the harsh contrasts in lighting levels between the project site and adjacent properties. Illumination standards are as follows:

1. Public, civic and religious buildings are permitted to be fully illuminated.
2. Parking lots, driveways, trash enclosures/areas, public phones, and group mailboxes shall be illuminated with a minimum maintained one foot-candle of light and an average not to exceed four foot-candles of light. The following uses shall provide additional lighting as described below:
    a. Convenience stores, card rooms, and check cashing establishments shall provide a minimum level of illumination of one and one-half foot-candles across the parking lot during business hours.
3. Pedestrian walkways shall be illuminated with a minimum maintained one-half foot-candle of light and an average not to exceed two foot-candles of light.

4. Entryways and exterior doors of nonresidential structures shall be illuminated during the hours of darkness, with a minimum maintained one foot-candle of light, measured within a five-foot radius on each side of the door at ground level.

5. In order to minimize light trespass on abutting residential property, illumination measured at the nearest residential structure or rear yard setback line shall not exceed the moon's potential ambient illumination of one-tenth foot-candle.

E. Maximum Height of Freestanding Outdoor Light Fixtures

The maximum height of freestanding outdoor light fixtures abutting residential development shall be 18 feet. Otherwise, the maximum height for freestanding outdoor light structures shall be 24 feet. Height shall be measured from the finish grade, inclusive of the pedestal, to the top of the fixture.

F. Energy-Efficient Fixtures Required

Outdoor lighting shall utilize energy-efficient (high pressure sodium, metal halide, low pressure sodium, hard-wired compact fluorescent, or other lighting technology that is of equal or greater efficiency) fixtures and lamps. All new outdoor lighting fixtures shall be energy-efficient with a rated average bulb life of not less than 10,000 hours.

G. Accent Lighting

Architectural features may be illuminated by uplighting; provided, that the lamps are low intensity to produce a subtle lighting effect and no glare or light trespass is produced. Wherever feasible, solar powered fixtures shall be used.

In addition, Section 2.12.8, "Outdoor Lighting Plans Required" of the proposed SunCreek Specific Plan Development Regulations provide the following.

A. When Required

A preliminary outdoor lighting plan shall be submitted as part of each planning permit application, and a final plan shall be submitted as part of an application for a building permit for a new structure or an addition of 25 percent of the gross floor area, seating capacity, or parking spaces. A final outdoor lighting plan is required for all new outdoor lighting installations on commercial, mixed-use, multi-unit residential, industrial, and institutional properties. The director may request outdoor lighting plans from applicants for other types of projects due to location, size, or proposed use, as necessary.

B. Plan Content

At a minimum, an outdoor lighting plan shall include the following:

1. Manufacturer specifications sheets, cut sheets, and other manufacturer-provided information for all proposed outdoor light fixtures to show fixture diagrams and outdoor light output levels.

2. The proposed location, mounting height, and aiming point of all outdoor lighting fixtures.

3. If building elevations are proposed for illumination, drawings of all relevant building elevations showing the fixtures, the portions of the elevations to be illuminated, the illumination level of the elevations, and the aiming point for any remote light fixture.

4. Photometric data including a computer-generated photometric grid showing foot-candle readings every 10 feet within the property or site and 10 feet beyond the property lines.

3.1.3 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or alternatives under consideration were determined to result in a significant impact related to aesthetic resources if they would do any of the following:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

ANALYSIS METHODOLOGY

This visual impact analysis is based on field observations conducted by AECOM on June 7, 2007, July 30, 2010 19, and September 19, 2010 and a review of maps and aerial photographs. Analysis of the project's impacts was based on evaluation of the changes to the existing visual resources that would result from project implementation. In making a determination of the extent and implications of the visual changes, consideration was given to:

- specific changes in the visual composition, character, and valued qualities of the affected environment;
- the visual context of the affected environment;
- the extent to which the affected environment contained places or features that have been designated in plans and policies for protection or special consideration; and
- the numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the project-related changes.

It should be noted that an assessment of visual quality is a subjective matter, and reasonable people can disagree as to whether alteration in the visual character of the SPA would be adverse or beneficial. For this analysis, a conservative approach was taken, and the potential for substantial change to the visual character of the SPA is generally considered a significant impact.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR/EIS

Scenic Resources within a State Highway—There are no roadways designated as scenic in, or within view of, the SPA. Thus, there would be no impact, and issues related to substantial damage to scenic resources within a state scenic highway are not discussed further in this EIR/EIS.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.1-1 **Substantial Adverse Effect on a Scenic Vista.** *Project implementation would result in the degradation of the visual quality of a scenic vista.*

NP

Under the No Project Alternative, no project-related development would occur; thus there would be no project-related impacts and no project-related construction that would affect views of the SPA. Therefore, there would be **no direct** or **indirect** impacts. ***[Lesser]***

NCP, PP, BIM, CS, ID

A scenic vista is generally considered an expansive view of a unique or remarkable landscape, which is observable from a location accessible to the public. The open grasslands of the SPA and adjacent undeveloped lands provide a pleasing rural view that is enhanced, on clear days that occur primarily in the winter and spring, with scenic views of the snow-covered peaks of the Sierra Nevada mountain range to the east. The grasslands and vernal pools on the SPA are a unique landscape, which in the spring provide views of green expanses, with vernal pools ringed by colorful wildflowers. This landscape, which is indigenous to the east side of the Central Valley, is becoming rare in close proximity to urbanized areas that are expanding onto these areas.

Implementation of the Proposed Project and the other four action alternatives would convert the SPA into an urban area, generally consisting of housing units and commercial development. Views from adjacent roadways toward the site would be permanently altered, substantially degrading the existing viewshed. Because the quality of the site is contingent on expansive views, all action alternatives, regardless of the level of proposed development, would have a similar effect on scenic resources. This area would become of similar visual quality to nearby developed land, and would no longer be considered a unique or scenic vista. Because the project-related alterations would have a substantial adverse effect on a scenic vista, this **direct** impact is **significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No feasible mitigation measures are available.

There are no feasible mitigation measures available that could fully reduce impacts associated with alteration of a substantial adverse effect on a scenic vista (degradation of and obstruction of a vast expanse of open area) to a less-than-significant level. Therefore, this impact is considered to be **significant and unavoidable**.

IMPACT 3.1-2 **Substantial Degradation of Existing Visual Character or Quality of the Site and its Surroundings.** *Project implementation would substantially degrade the visual character of the SPA to developed urban uses.*

NP

Under the No Project Alternative, no project-related development would occur; thus there would be no project-related impacts and no project-related construction that would affect the visual character of the SPA. Therefore, there would be **no direct** or **indirect** impacts. ***[Lesser]***

Implementation of any of the five action alternatives would alter the visual character of the approximately 1,253-acre SPA from an open rural landscape to an urbanized landscape, which includes multi-storied residential and commercial structures and roadways, paths, and other paved surfaces. As shown in Table 2-15 (Section 2, “Alternatives”), all action alternatives would include project characteristics that are contrary to the existing visual quality of the site. This development would permanently alter the foreground and middleground views from within the SPA and from viewers outside the SPA looking in. Distant views of the Sierra Nevada foothills and mountain range would no longer be visible, because they would be blocked by structures. The visual character of the site would be substantially altered. The vast expanse of open area would be obstructed by project development.

Reasonable people may differ as to the aesthetic value of undeveloped grasslands, and whether development of urban uses in the SPA would constitute a substantial degradation of the existing visual character or quality of the site and its surroundings. However, given the large scale of this urban development and the rural nature of its setting, a conservative approach has been taken for this analysis, and the degradation of visual character at the SPA is considered to be substantial, and impacts on visual resources from project implementation are considered to be **direct** and **significant. No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.1-2: Require Development to Conform with Design Standards Identified in the SunCreek Specific Plan.

The project applicants for any particular discretionary development application shall implement design, architectural, development, and maintenance standards identified in *the SunCreek Specific Plan*. The following shall be implemented:

- Design standards regarding building design, massing, scale, and orientation shall be applied at the interface between the open space preserve and residential and commercial development in order to ensure that project design is compatible with open space preservation and to minimize the visual impacts of the built environment on the open space.
- Automobile, pedestrian, and bicycle trails shall be designed to minimize visual impacts by providing for landscaping, and by keeping streets and paved trails to minimum required widths, where feasible.
- Landscaping shall be compatible with adjacent preserved areas by emphasizing landscapes that use non-invasive plants native to the region.

Implementation: Project applicants for any particular discretionary development application.

Timing: Before approval of building permits for all structures within all project phases.

Enforcement: City of Rancho Cordova Planning Department.

Implementation of Mitigation Measure 3.1-2 would partially reduce impacts related to the degradation of the local visual resources through conversion of undeveloped rural lands to large-scale urban development as proposed by the No USACE permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives. This measure, however, would not fully reduce impacts to a less-than-significant level. Because of the scale of the project and location of the SPA, there are no feasible mitigation measures available to address aesthetic impacts associated with the conversion of a large expanse of rural land to urban development. Although development in the SPA would conform to design, architectural, development, and maintenance standards identified in the SunCreek Specific Plan, there is no mechanism to allow implementation of the project while entirely avoiding conversion of the existing visual environment from a rural landscape to an urban landscape. Therefore, the impact would remain **significant and unavoidable**.

IMPACT 3.1-3 **Temporary, Short-Term Degradation of Visual Character for Developed Project Land Uses During Construction.** *Project implementation would involve the temporary and short-term use of staging areas for construction equipment and materials, which would be visible to adjacent project land uses that have already been developed.*

NP

Under the No Project Alternative, no project-related development would occur; thus there would be no project-related impacts and no project-related construction that would affect views of the SPA. Therefore, there would be **no direct** or **indirect** impacts. ***[Lesser]***

NCP, PP, BIM, CS, ID

The presence and movement of heavy construction equipment and staging areas could temporarily degrade the existing visual character and/or quality of the SPA and surrounding area for existing developed land uses. Buildout of the project is anticipated to occur over a 20-year period, with construction anticipated to begin in 2012 and end in 2032. During this time, adjacent project development, including sensitive land uses such as residential housing, schools, and parks, would be occupied while construction is occurring in a different phase.

Construction activities would require the use of various types of equipment, such as scrapers, graders, dozers, and trucks as well as signs, cones, and trash receptacles. Project construction would involve the temporary use of fenced staging areas for construction equipment and materials. Although these staging areas would be located in disturbed areas, construction equipment and materials would be visible to residents, employees at existing businesses, and at parks and school sites over a 20-year duration.

Thus, construction activities would temporarily degrade the existing visual character of the SPA in the vicinity of developed areas. This temporary and short-term impact is **direct** and **significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.1-3: Screen Construction Staging Areas.

The project applicants for any particular discretionary development application shall locate staging and material storage areas as far away from sensitive land uses (e.g., residential areas, schools, parks) as feasible. The location of staging and material storage areas shall be approved by the City of Rancho Cordova before the approval of grading plans and building permits for all project phases and shall be screened from adjacent occupied land uses in earlier development phases to the maximum extent practicable. Screens may include, but are not limited to, the use of visual barriers such as berms or fences. The screen design shall be approved by the City of Rancho Cordova to further reduce visual effects to the extent feasible.

Implementation: Project applicants for any particular discretionary development application.

Timing: Before approval of building permits for each project phase.

Enforcement: City of Rancho Cordova Planning Department.

Implementation of Mitigation Measure 3.1-3 would reduce significant impacts associated with temporary and short-term visual-quality degradation for developed land uses from concurrent construction activities under the No USACE permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level by providing visual screening.

IMPACT 3.1-4 **Creation of a New Source of Substantial Light or Glare that would Adversely Affect Day or Nighttime Views in the Area.** *Project implementation would require lighting of new development, which would cause new and increased sources of light and glare.*

NP

Under the No Project Alternative, no project-related development would occur; thus there would be no project-related impacts resulting in new sources of light or glare that would adversely affect day and nighttime views in the area. Therefore, there would be **no direct** or **indirect** impacts. ***[Lesser]***

NCP, PP, BIM, CS, ID

Light associated with urban development can result in spillover lighting and glare effects. Spillover lighting is artificial lighting that spills over onto adjacent properties and could cause an annoyance to neighboring residents by disturbing sleep patterns. Glare is intense light that shines directly, or is reflected off a surface, into a person's eyes. Use of building materials such as reflective glass and polished surfaces can cause glare. During daylight hours, the amount of glare depends on the intensity and direction of sunlight. Glare is particularly acute at sunrise and sunset because of the low angle of the sun in the sky.

Currently, the SPA consists of grasslands, with a few utility-related structures (e.g., electrical transmission towers and lines), and a few scattered rural residences. Implementation of proposed development would require lighting for roadways; commercial, office, and industrial buildings; parking lots; residences; and other public facilities such as schools and parks. In addition, nighttime lighting or the presence of reflective surfaces on buildings in the commercial, office, and industrial areas (e.g., reflective window glazing) may result in light and glare shining onto motorists on adjacent roadways. Therefore, project implementation would substantially increase light and glare in the SPA and adjacent areas. Thus, this impact would be **direct** and **significant. No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.1-4: Prepare and Implement a Lighting Plan.

To reduce impacts associated with light and glare, the project applicants of all project phases shall:

- Shield or screen lighting fixtures to direct the light downward and prevent light spill on adjacent properties.
- Place and shield or screen flood and area lighting needed for construction activities, nighttime sporting activities, and/or security so as not to disturb adjacent residential areas and passing motorists.
- For public lighting in residential neighborhoods, prohibit the use of light fixtures that are of unusually high intensity or brightness (e.g., harsh mercury vapor, low-pressure sodium, or fluorescent bulbs) or that blink or flash.
- Use appropriate building materials (such as low-glare glass, low-glare building glaze or finish, neutral, earth-toned colored paint and roofing materials), shielded or screened lighting, and appropriate signage in the office/commercial areas to prevent light and glare from adversely affecting motorists on nearby roadways.
- Design exterior on-site lighting as an integral part of the building and landscape design in the SPA. Lighting fixtures shall be architecturally consistent with the overall site design.
- Lighting of facilities as proposed in the lighting plan shall be consistent with the City's General Plan standards.

A lighting plan for all project elements shall be submitted to the City for review and approval, which shall include the above elements. The lighting plan may be submitted concurrently with other improvement plans, and shall be submitted before the installation of any lighting or the approval of building permits for each phase. The project applicants of all project phases shall implement the approved lighting plan.

Implementation: Project applicants for any particular discretionary development application.

Timing: Before approval of building permits for each project phase.

Enforcement: City of Rancho Cordova Planning Department.

Implementation of Mitigation Measure 3.1-4 would reduce significant impacts associated with effects from new sources of light and glare to a **less-than-significant** level under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives by requiring the project applicants of all project phases to prepare and implement lighting plan and by requiring conformance with established City General Plan standards.

IMPACT 3.1-5 **New Skyglow Effects.** *Project implementation would require lighting of new development that would result in the generation of new and increased skyglow effects, obscuring views of stars, constellations, and other features of the night sky.*

NP

Under the No Project Alternative, no project-related development would occur; thus there would be no project-related impacts resulting in a new skyglow effect. Therefore, there would be **no direct** or **indirect** impacts. ***[Lesser]***

NCP, PP, BIM, CS, ID

Skyglow is artificial lighting from urbanized uses that alters the rural landscape and, in sufficient quantity, lights up the nighttime sky, thus reducing the visibility of astronomical features. The SPA consists primarily of undeveloped agricultural grazing land. Existing lighting sources are associated with a few scattered rural residences, and lighting on utility towers to provide airspace security. The existing land uses are not a substantial source of nighttime lighting. Therefore, these areas generate no substantial sources of skyglow into the night sky. However, a substantial increase in the amount of nighttime light would result from the development of the SPA with urban land uses including residences, commercial and industrial land uses, and schools and parks over approximately 1,265 acres, which would obscure views of the stars, constellations, and other features of the night sky. Because project implementation would introduce a substantial quantity of nighttime light over a large area of a rural landscape that is essentially dark under existing conditions, overall skyglow effects are considered a **significant** and **direct** impact. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3.1-4.

Implementation of Mitigation Measure 3.1-4 would partially reduce significant impacts associated with effects from skyglow under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Development, and Increased Development Alternatives, but not to a less-than-significant level. Mitigation Measure 3.1-4 would require the development and implementation of an on-site lighting plan and conformance with City General Plan standards. However, because of the scale and location of the SPA, screening or shielding of light fixtures to direct light downward or the use of low-pressure sodium or other lighting would not reduce the effects of new skyglow on the night sky to a less-than-significant level, and there are no other feasible mitigation measures available. Therefore, impacts would remain **significant and unavoidable**.

3.1.4 RESIDUAL SIGNIFICANT IMPACTS

Impacts related to substantial alteration of a scenic vista would be significant and unavoidable because no feasible mitigation measures are available to fully reduce these impacts to a less-than-significant level.

Although implementation of Mitigation Measure 3.1-2 would require that design, architectural, development, and maintenance standards identified in the SunCreek Specific Plan are followed, impacts resulting from the substantial degradation of existing visual character or quality of the site and its surroundings would remain significant and unavoidable because there are no additional feasible mitigation measures available to fully reduce this impact to a less-than-significant level based on the size of the proposed development.

Implementation of Mitigation Measure 3.1-4 would help to reduce the impacts from skyglow because a lighting plan with components specifically designed to reduce skyglow would be implemented. However, because of the scale and location of the SPA, screening or shielding of light fixtures to direct light downward or the use of low-pressure sodium or other lighting would not reduce the effects of new skyglow on the night sky to a less-than-significant level, and there are no other feasible mitigation measures available. Therefore, impacts would remain **significant and unavoidable**.

3.1.5 CUMULATIVE IMPACTS

The geographic scope of visual impacts consists of the City of Rancho Cordova and eastern Sacramento County south of U.S. 50. Development is increasingly changing the visual character along roadway corridors in both the City of Rancho Cordova and Sacramento County, from grazing/rural lands and vast areas of open space to urban uses, thus altering and limiting the views available to motorists along these roadways and residents living in the area. This trend will continue as future projects are implemented in the region and in Rancho Cordova as a whole, consistent with growth planned in the City General Plan, and community plans and specific plans, including the Anatolia III, Arboretum, Arista Del Sol, and the Ranch at Sunridge, which border the SPA. In addition, the Cordova Hills project immediately east of the SPA (on the east side of Grant Line Road in Sacramento County) would also alter and limit available views. Substantial changes in visual conditions will continue as agricultural lands and open space are replaced by urban development in the City of Rancho Cordova and Sacramento County. These projects are planned for build-out over the next few decades and will result in substantial adverse effects to the existing visual character of eastern Sacramento County, both during construction activities and on a permanent basis. As described above, the SPA is considered to be a scenic vista because it is characterized as undeveloped lands with far-reaching views, which would no longer exist once the land in the vicinity of the SPA is developed. Thus, implementation of the project would result in a cumulatively considerable incremental contribution to significant cumulative impacts on the scenic vista and degradation of the visual character of Rancho Cordova and southeastern Sacramento County, during construction activities and project operation.

Increased urban development would also lead to increased daytime and nighttime light and glare and subsequent skyglow in the region and more limited views of the night sky. This is especially the case in the southern area of Rancho Cordova, which is planned to undergo a large-scale change from open space to urban uses. The cumulative effect of these changes on aesthetic resources from past and planned future projects, as well as the contribution from the project, is considered a significant impact. Although these cumulative impacts can be minimized to a degree through vegetative and topographic screening of structures and appropriate building design, as well as implementation of Mitigation Measure 3.1-4 that requires implementation of a lighting plan (e.g., use of non-reflective building surfaces, use of outdoor lighting that limits light spillover, and other measures), the significant cumulative impact cannot be fully mitigated. Therefore, the cumulative change of agricultural and open-space views in the project region to urban land uses and the associated increase in daytime glare and nighttime light and subsequent skyglow are considered direct, adverse, and significant and unavoidable impacts. In addition, the project's incremental contribution to these impacts is cumulatively considerable.

3.2 AIR QUALITY

3.2.1 AFFECTED ENVIRONMENT

The SPA is located in the city of Rancho Cordova, in Sacramento County, California, in an area under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). SMAQMD operates at the local level with primary responsibility for attaining and maintaining the Federal and state ambient air quality standards in Sacramento County.

Sacramento County is within the Sacramento Valley Air Basin (SVAB), which also includes all of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, Yolo, and Yuba Counties, the western portion of Placer County, and the eastern portion of Solano County. Air quality in the SVAB is also regulated at the Federal level by the U.S. Environmental Protection Agency (EPA) and the state level by the California Air Resources Board (ARB). Each of these agencies develops rules, regulations, and policies to comply with applicable legislation. Although EPA regulations may not be superseded, both state, regional, and local regulations may be more stringent. Applicable regulations associated with criteria air pollutant, toxic air contaminant (TAC), and odor emissions are described in the following sections.

Ambient concentrations of air pollutants (including odors and greenhouse gases, or GHGs) are determined by the qualities and quantities of emissions released by sources and the atmosphere's ability to transport, dilute, and transform the emissions. Natural factors that affect transport, dilution, and transformation include terrain, wind, atmospheric stability, and sunlight. The combination of low wind speeds and restricted vertical mixing generally produces the highest concentrations of air pollutants. Therefore, existing air quality conditions in an area are determined by natural factors, such as topography, meteorology, and climate, in addition to the sources and strengths of emissions, as discussed separately below.

TOPOGRAPHY, CLIMATE, AND METEOROLOGY

The SVAB is relatively flat, bordered by mountains to the east, west, and north. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin River Delta (Delta), bringing with it pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters.

Periods of dense and persistent low-level fog that are most prevalent between storms are characteristic of SVAB winter weather. The average winter temperature is a moderate 49 degrees Fahrenheit (°F). Most precipitation in the area results from air masses that move in from the Pacific Ocean from the west or northwest during the winter rainy season (November–April). During the summer, daily temperatures range from 50°F to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature.

Regional and localized meteorological conditions, such as wind flow patterns, disperse pollutants and reduce pollutant concentrations. An inversion layer develops when a layer of warm air traps cooler air close to the ground. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells lie over the valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in the air. The surface concentrations of pollutants are highest when these conditions are combined with strong ground-level sources (SMAQMD 2009:1-7–1-8).

The ozone season (May–October) in the Sacramento Valley is characterized by stagnant morning air or light winds with the Delta sea breeze arriving in the afternoon from the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. During about half of the days from July to September, however, a phenomenon called the "Schultz Eddy" prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north carrying the pollutants out of the valley, the Schultz Eddy causes the wind pattern and pollutants to circle back southward. This phenomenon's effect exacerbates the pollution levels in the area and increases the likelihood of violating the Federal and state air quality standards (SMAQMD 2009:1-7–1-8).

The local meteorology of the project area (SPA and vicinity) is represented by measurements recorded at the Sacramento 5 ESE station, near California State University (CSU), Sacramento. The normal annual precipitation, which occurs primarily from November through April, is approximately 18 inches (Western Regional Climate Center [WRCC] 2010a). January temperatures range from an average minimum of 40°F to an average maximum of 53°F. July temperatures range from an average minimum of 59°F to an average maximum of 92°F (WRCC 2010a). The predominant wind direction and speed is from the south-southwest at approximately 8 mph (WRCC 2010b; National Climatic Data Center [NCDC] 2010).

EXISTING AIR QUALITY—CRITERIA AIR POLLUTANTS

California and National Ambient Air Quality Standards

ARB and EPA currently focus on the following air pollutants as indicators of ambient air quality: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as "criteria air pollutants."

EPA has established primary and secondary national ambient air quality standards (NAAQS) for the following criteria air pollutants (CAPs): ozone, CO, NO_2, SO_2, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead. The primary standards protect the public health and the secondary standards protect public welfare. In addition to the NAAQS, ARB has established California ambient air quality standards (CAAQS) for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, in addition to the above-mentioned CAPs. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health-effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate an additional margin of safety to protect sensitive receptors, particularly children and infants (ARB 2010a). The NAAQS and CAAQS as discussed above are listed in Table 3.2-1, and health effects are described in Table 3.2-2.

California and National Area Designations

Both ARB and EPA use ambient air quality monitoring data to designate areas according to their attainment status for CAPs. The purpose of these designations is to identify the areas with air quality problems and initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. An "attainment" designation for an area signifies that pollutant concentrations did not exceed the established standard. In most cases, areas designated or redesignated as attainment must develop and implement maintenance plans which are designed to assure continued compliance with the standard (SMAQMD 2009:1-2).

In contrast to attainment, a "nonattainment" designation indicates that a pollutant concentration has exceeded the established standard. Nonattainment may differ in severity. To identify the severity of the problem and the extent of planning and actions required to meet the standard, nonattainment areas are assigned a classification that is commensurate with the severity of their air quality problem (e.g., moderate, serious, severe, extreme).

Finally, an unclassified designation indicates that there is insufficient data for determining attainment or nonattainment (SMAQMD 2009:1-2). In addition, the California designations include a subcategory of nonattainment-transitional, which is given to nonattainment areas that are progressing and nearing attainment.

Table 3.2-1
Summary of Ambient Air Quality Standards and Attainment Designations

Pollutant	Averaging Time	California		National Standards[1]		
		Standards[2,3]	Attainment Status (Sacramento County)[4]	Primary[3,5]	Secondary[3,6]	Attainment Status (Sacramento County)[7]
Ozone	1-hour	0.09 ppm (180 μg/m^3)	N (Serious)	–	–	–
	8-hour	0.070 ppm (137 μg/m^3)	N	0.075 ppm (147 μg/m^3)	Same as Primary Standard	N (Severe)
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	U/A (Maintenance Status)
	8-hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	A	0.053 ppm (100 μg/m^3)	Same as Primary Standard	U/A
	1-hour	0.18 ppm (339 μg/m^3)	A	0.100 ppm	–	–
Respirable particulate matter (PM_{10})	Annual Arithmetic Mean	20 μg/m^3	N	–	Same as Primary Standard	N (Moderate)
	24-hour	50 μg/m^3		150 μg/m^3		
Fine particulate matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m^3	N	15 μg/m^3	Same as Primary Standard	N
	24-hour	No Separate State Standard		35 μg/m^3		

Notes: ppm = parts per million; μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter

1 National standards (other than ozone, particulate matter, and those standards based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than 1 day. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. Environmental Protection Agency for further clarification and current Federal policies.

2 California standards for ozone, CO (except Lake Tahoe), NO_2, and particulate matter are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

3 Concentrations are expressed first in units in which they were issued (i.e., ppm or μg/m^3). Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4 Unclassified (U): The data are incomplete and do not support a designation of attainment or nonattainment.
Attainment (A): The state standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment (N): There was at least one violation of a state standard for that pollutant in the area.

5 National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

6 National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7 Nonattainment (N): Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.
Attainment (A): Any area that meets the national primary or secondary ambient air quality standard for the pollutant.
Unclassifiable (U): Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Sources: ARB 2010a, 2010b; EPA 2010a.

Table 3.2-2
Health Effects of Criteria Air Pollutants

Pollutant	Acute[1] Health Effects			Chronic[2] Health Effects		
	Concentration	Averaging Time	Symptoms	Concentration	Averaging Time	Symptoms
Ozone	0.10 ppm–0.40 ppm	1-2 hours	increased respiration and pulmonary resistance; cough, pain, shortness of breath	–	long/lifetime	permeability of respiratory epithelia, possibility of permanent lung impairment
	<= 0.12 ppm	hours	lung inflammation			
Carbon monoxide (CO)	70 ppm–400 ppm	< 3 hours	headache, dizziness, fatigue, nausea, vomiting	–	after acute exposure not resulting in death	permanent heart and brain damage
	> 800 ppm	2-3 hours	death			
Nitrogen dioxide (NO_2)	10-20 ppm	short	coughing, difficulty breathing, vomiting, headache, eye irritation	–	severe intoxication after acute exposure	chronic bronchitis, decreased lung function
	–	4–12 hours	chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat			
	> 150 ppm	hours	death			
Respirable particulate matter (PM_{10}), Fine particulate matter ($PM_{2.5}$)	dependent on particle size, composition, number	–	breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	dependent on particle size, composition, number	long/lifetime	alterations to the immune system, carcinogenesis

Notes: ppm = parts per million
[1] "Acute" refers to effects of short-term exposures to criteria air pollutants, usually at fairly high concentrations.
[2] "Chronic" refers to effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations.
Sources: Godish 2004, New Hampshire Department of Environmental Services [NHDES] 2007, U.S. Office of Technology Assessment [USOTA] 1989, EPA 2010b, 2010c

Sacramento County is designated nonattainment for the state and Federal ozone, PM_{10} and $PM_{2.5}$ standards. However, air quality monitoring data shows that Sacramento County does meet the Federal PM_{10} standard. Because the entire state is in attainment for SO_2 and most of the state is in attainment for lead (except for one area of Los Angeles County), SO_2 and lead will not be discussed further.

Criteria air pollutant concentrations are measured at 13 monitoring stations in Sacramento County. The Sloughhouse station is the closest monitoring station to the SPA with recent data for ozone. PM_{10} data were not available at the Sloughhouse station, and therefore were obtained from the Branch Center Road #2 station in Sacramento, which is the next closest monitoring station to the SPA. CO, NO_2, and $PM_{2.5}$ data were obtained from the Del Paso Manor station. In general, the ambient air quality measurements from these monitoring stations are representative of the air quality in the vicinity of the SPA. Table 3.2-3 summarizes the air quality data from the most recent 3 years for these monitoring stations.

Table 3.2-3
Summary of Annual Ambient Air Quality Data (2007–2009)

	2007	2008	2009
Ozone[a]			
Maximum concentration (1-hour/8-hour average, ppm)[b]	0.097/0.089	0.148/0.108	0.122/0.099
Number of days state 1-hour standard exceeded	2	16	11
Number of days state/national 8-hour standard exceeded	17/10	37/19	34/24
Nitrogen Dioxide (NO_2)[c]			
Maximum concentration (1-hour, ppm)	0.051	0.058	0.049
Annual arithmetic mean concentration (ppm)	0.011	0.011	0.010
Number of days state 1-hour standard exceeded	0	0	0
Carbon Monoxide (CO)[c]			
Maximum concentration (1-hour/8-hour average, ppm)[b]	3.5/2.9	2.9/2.49	3.1/2.77
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
Fine Particulate Matter ($PM_{2.5}$)[c]			
State annual average design value exceeded	yes	yes	yes
National annual average design value exceeded	yes	yes	yes
Estimated number of days national 24-hour standard exceeded	26.1	24.1	8.9
Respirable Particulate Matter (PM_{10})[d]			
Maximum 24-hour average concentration ($\mu g/m^3$)[b]	60.0	89.0	76.0
Estimated number of days state 24-hour standard exceeded	30.2	68.7	12.2
Estimated number of days national 24-hour standard exceeded	0	0	0

Notes: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

[a] Ozone data were obtained from the Sloughhouse monitoring station in Sacramento, which is the closest monitoring station to the SPA.

[b] The 1-hour maximum concentrations are measured values; all other reported averages are based on state methods.

[c] Data from the Del Paso Manor station were utilized for NO_2, CO, and $PM_{2.5}$.

[d] Data from the Branch Center Road #2 station were used for PM_{10}, the second closest monitoring station to the SPA.

Sources: ARB 2009c, 2009d; EPA 2009b

Criteria Air Pollutants

Ozone

Ozone is a photochemical oxidant, a highly reactive gas, and even at low concentrations it is irritating and toxic. Ozone is the primary component of smog and is not emitted directly into the air, but formed through complex chemical reactions between precursor emissions of reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. ROG are volatile organic compounds (VOCs) that are emitted from natural sources (such as plants), incomplete fossil fuel combustion, and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels. ROG and NO_X are not themselves CAPs (with the exception of NO_2), but are controlled through Federal, state, regional, and local regulations, programs, and rules to limit ozone formation.

Ozone located in the upper atmosphere (stratosphere) shields the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds and stagnant air coupled with warm temperatures and sunlight provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur downwind of the precursor emissions, making ozone a regional pollutant that can affect large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (ARB 2009a:1-19; Godish 2004:51–55).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but also healthy adults. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 part per million (ppm) for 1 or 2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia, which can inhibit the immune system's ability to defend against infection (Godish 2004:159–161).

In 1997, EPA promulgated a new 8-hour standard in recognition of impacts resulting from daylong exposure. On April 15, 2004, EPA designated areas of the country that exceed the 8-hour standard ozone standard as nonattainment. The designations were in place as of February 2009. These designations have triggered new planning requirements for the 8-hour standard.

Because it does not meet the air quality standards for ozone, Sacramento County, as part of the larger Sacramento Federal Ozone Nonattainment Area (SFNA), is designated a "severe" nonattainment area for the Federal eight hour ozone standard, and is designated a "serious" nonattainment area for the state one hour ozone standard.

Trends

On-road motor vehicles and other mobile sources are by far the largest contributors to NO_X emissions in the SVAB. According to the 2008 emissions inventory for Sacramento County, approximately 58% of NO_X emissions in Sacramento County are generated by on-road motor vehicles; an additional 33% of NO_X emissions are generated by other mobile sources, most notably off-road vehicles (ARB 2009b). More stringent mobile source emission standards and cleaner burning fuels have largely contributed to a decline in NO_X emissions in the past 30 years (ARB 2009a:A-36). On-road motor vehicles contributed 37% of the ROG emissions in Sacramento County in 2008, with other mobile sources contributing an additional 33% (ARB 2009b). ROG emissions have been decreasing significantly for the last 30 years because of more stringent motor vehicle standards and new rules for control of ROG from various industrial coating and solvent operations (ARB 2009a:A-36). Even so, the ozone problem in the SVAB ranks among the most severe in the state. Peak ozone values in the SVAB have not declined as quickly over the last several years as they have in other urban areas. The peak 8-hour indicator remained fairly constant from 1988 to 2007 (ARB 2009a:A-92). Since the early 1990s, the peak 8-hour indicator has decreased slightly, and the overall decline for the 20-year period is on the order of 10%. Looking at the number of days above the state and national standards, the trend is much more variable. The numbers of exceedance days have not declined significantly since the early 1990s (ARB 2009a:A-92).

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which oxidizes in the atmosphere to form NO_2 (EPA 2010b). The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources. In California, NO_X is primarily emitted by mobile sources, which account for 86% of the total state NO_X emissions (ARB 2009a:2-4).

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure (Office of Environmental Health Hazard Assessment [OEHHA], 2008:209-216). After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions (OEHHA 2008:209-216).

Sacramento County is in attainment for NO_2.

Trends

As described previously, mobile sources are by far the largest contributors to NO_X emissions in Sacramento County, accounting for 91% of the total (ARB 2009b). More stringent mobile source emission standards and cleaner burning fuels have largely contributed to a decline in NO_X emissions (ARB 2009a:4-57, A-36). Maximum one-hour concentrations of NO_2 in Sacramento County have been variable, without significant decline, since the early 1990s; however, maximum annual averages have dropped by about 25% in the past decade.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, and poisonous gas produced by incomplete combustion of carbon in fuels, primarily from mobile (transportation) sources, which comprised 80% of the statewide CO emissions in 2008. The remaining 20% of CO is emitted primarily from wood-burning stoves, managed burning, and incineration (ARB 2009a:2-4–2-11).

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO include dizziness, headaches, fatigue, and at higher concentrations, death (EPA 2010b, NHDES 2007).
CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2010c:171).

The highest CO concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to ozone, a regional pollutant, CO tends to cause localized problems.

Sacramento County is in attainment for CO and is currently in a “maintenance status.”

Trends

On-road motor vehicles and other mobile sources are by far the largest contributors to CO emissions. Emissions of CO in Sacramento County have declined by almost a factor of five since 1990 (ARB 2009a:A-36). No violations of the state or Federal 8-hour CO standards have occurred since 1993.

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 microns or less is referred to as PM_{10}. The major fraction of PM_{10} by mass consists of coarse particulate matter emitted directly into the air, such as mechanically-generated dust, soot, and smoke from mobile sources, stationary sources, and fires. $PM_{2.5}$ is subgroup of PM_{10}, composed of finer particles that have an aerodynamic diameter of 2.5 microns or less, generally formed by secondary processes, such as condensation of combustion gases or transformation of ambient SO_2, NO_X, and ROG (EPA 2010b).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, adverse health effects may be associated with adsorption of metals, polycyclic aromatic hydrocarbons, and other toxic substances onto fine PM (“piggybacking”), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (EPA 2010b). Fine particulate matter ($PM_{2.5}$) poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.

Sacramento County is currently designated as nonattainment for the state and Federal $PM_{2.5}$ and PM_{10} standards.

Trends

The largest sources of $PM_{2.5}$ and PM_{10} in Sacramento County are areawide sources, such as residential fuel combustion, construction and demolition, and road dust, which account for 73% of $PM_{2.5}$ emissions and 89% of PM_{10} emissions (ARB 2009b).

Direct emissions of PM_{10} have been increasing in Sacramento County in the past 30 years, primarily from areawide sources such as paved road dust, which increases proportionally with vehicle miles traveled, or VMT. The population and subsequent VMT growth rates in the SVAB are larger than statewide population and VMT growth rates during the 1980-2020 timeframe (ARB 2010a:4-57). Direct emissions of $PM_{2.5}$ have been fairly stable over the same time period. Statewide programs aimed at reducing ozone and diesel PM (DPM) will also help to reduce public exposure to $PM_{2.5}$.

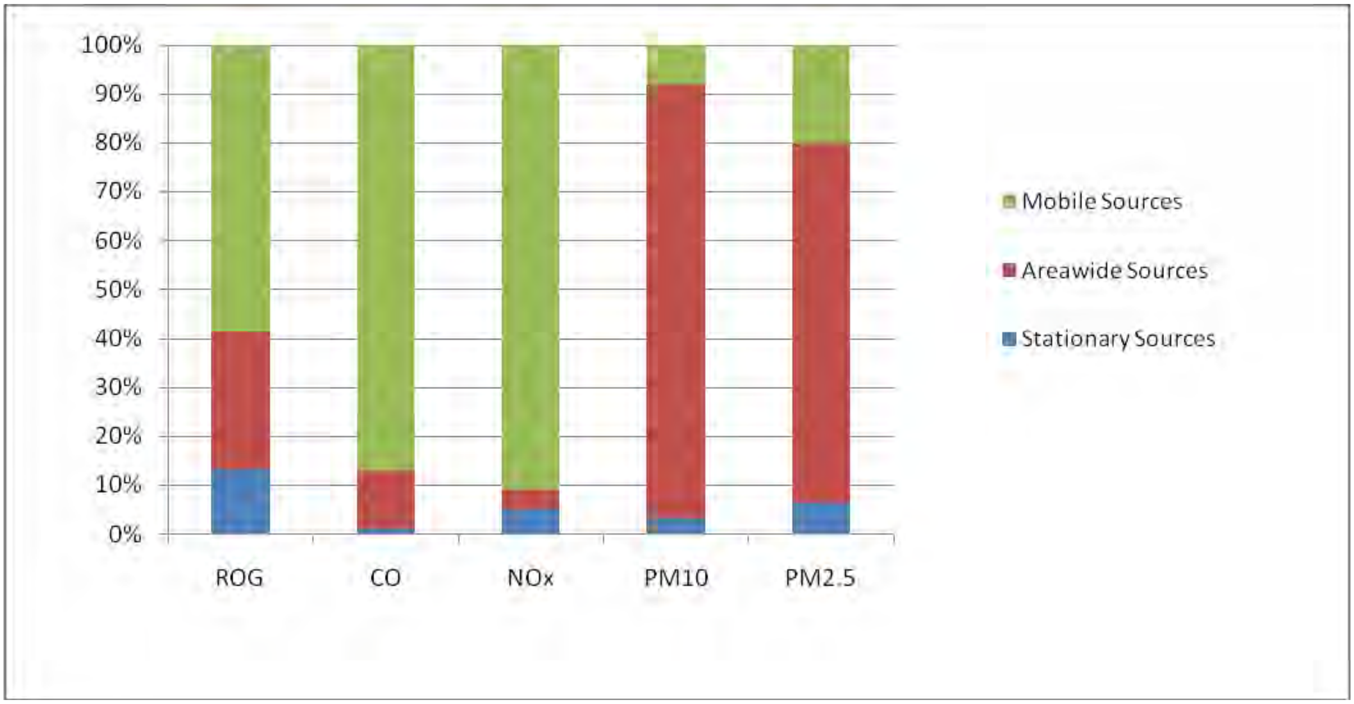
State and national maximum 24-hour concentrations of PM_{10} have been variable in Sacramento County for the past decade, with no discernible downward trends. National and state annual average concentrations of PM_{10} have been fairly stable over the same period of time. The number of violations of the state 24-hour standard have been variable over the past 15 years, with no decreasing trend, and there have been no violations of the national 24-hr standards since before 1989 (ARB 2009a:A-92).

State maximum 24-hour $PM_{2.5}$ concentrations have been decreasing in Sacramento County in the past decade, while national maximum 24-hour $PM_{2.5}$ concentrations have been more variable. State and national $PM_{2.5}$ averages have been fairly constant for the past decade (ARB 2009a:A-92).

Emission Sources

Sources of CAPs in Sacramento County and the SPA include stationary, area, and mobile sources. According to the 2008 emissions inventory for Sacramento County, the majority of NO_X emissions are attributable to mobile sources; stationary and areawide sources are the greatest contributors of organic gases (ozone precursors from landfills, farming, and managed burning), while areawide and mobile sources are the greatest contributors of CO (managed burning and vehicular traffic), and PM (road dust and managed burning) (ARB 2009b).

Exhibit 3.2-1 summarizes emissions of criteria air pollutants and precursors within Sacramento County for various source categories.



Notes: ROG = reactive organic gases; CO = carbon monoxide; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter.

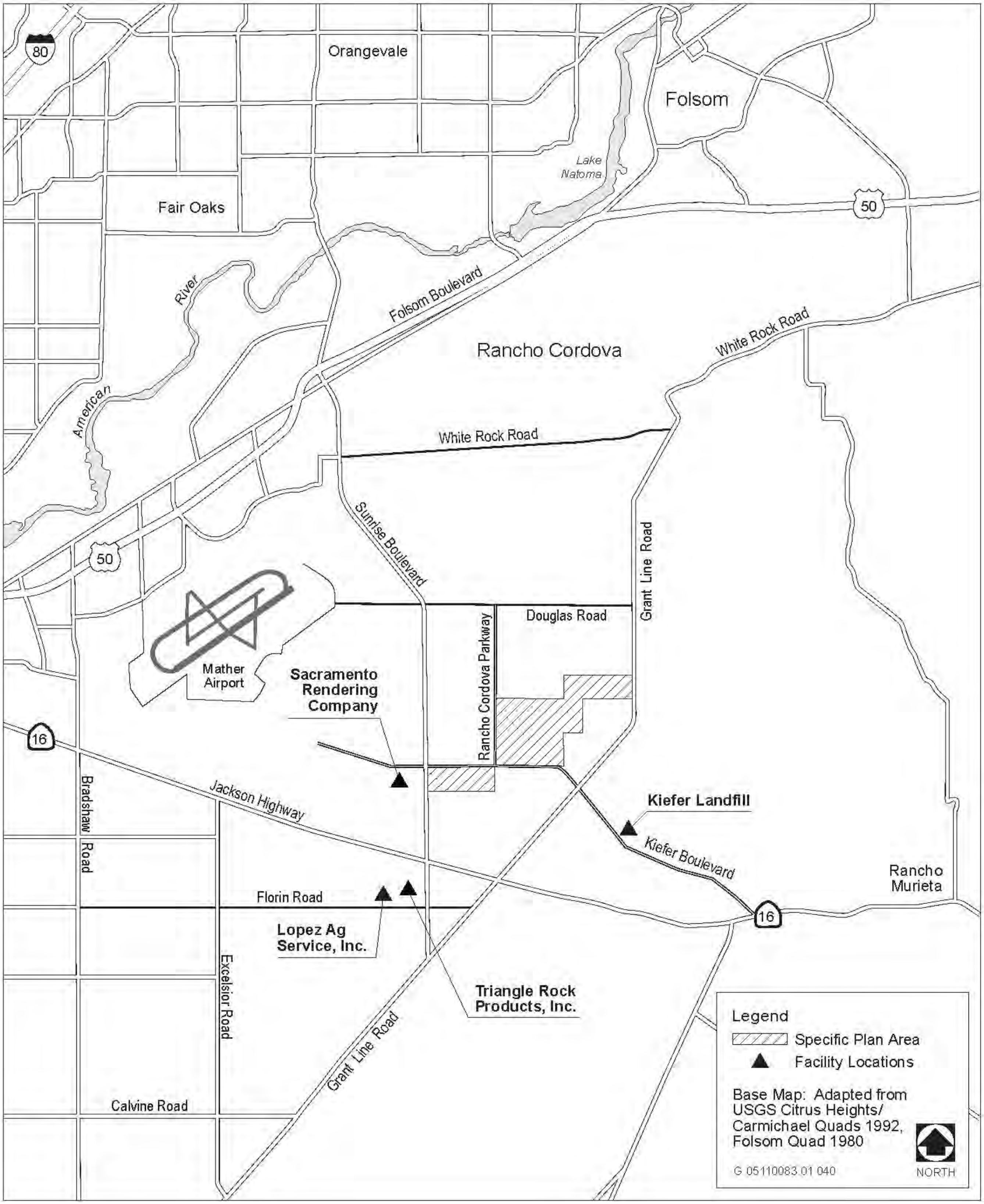
Source: ARB 2009b

Summary of 2008 Estimated Emissions Inventory for Criteria Air Pollutants and Precursors (Sacramento County, Tons/Day) **Exhibit 3.2-1**

Stationary Sources

Most stationary sources of CAP emissions within the City and County of Sacramento are minor sources, and include hospitals, small electrical producers and cogeneration facilities, and light commercial and industrial processes (i.e., asphalt mixing, sand and gravel production, brick and tile manufacturing, fiberglass manufacturing, food processing with and without cogeneration) (ARB 2010e, 2010f). There are no major stationary sources of CAPs near the SPA (see Exhibit 3.2-2).

Kiefer Landfill is within 2 miles of the SPA, to the southeast, (see Exhibit 3.2-2), and is the largest source of organic gas (mainly methane, a GHG) in Sacramento County; it is a small source of other criteria pollutants (ARB 2009a, 2010e, 2010f).



Source: ARB 2010e

CAPs, TACs, Odors, and Sensitive Receptors Near the SPA **Exhibit 3.2-2**

Areawide Sources

Areawide sources of emissions in Sacramento County include solvent evaporation from consumer products and application of architectural coatings, residential fuel combustion, construction and demolition, road dust, managed burning, farming, and other miscellaneous sources. Solvent evaporation is the largest contributor to ROG emissions; residential fuel combustion is the largest contributor to CO and NO_X emissions; and construction/ demolition and road dust are largest contributors to PM emissions in the county (ARB 2009b).

Mobile Sources

On-road and other mobile sources are the largest contributors of ROG, CO, and NO_X within Sacramento County. On-road sources consist of passenger vehicles, trucks, buses, and motorcycles, while off-road vehicles and other mobile sources are comprised of heavy-duty equipment, boats, aircraft, trains, recreational vehicles, and farm equipment.

Major roadways near the SPA include Sunrise Boulevard, Douglas Road, Grant Line Road, and Jackson Highway (State Route [SR 16]), with traffic volumes approaching 30,000 vehicles per day at the intersections of Sunrise Boulevard/Douglas Road to Kiefer Boulevard and Sunrise Boulevard/Kiefer Boulevard to SR 16 (Fehr & Peers 2010).

EXISTING AIR QUALITY—TOXIC AIR CONTAMINANTS

TACs are air pollutants that may cause or contribute to an increase in mortality or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air. However, their high toxicity or health risk may pose a threat to public health even at low concentrations. According to *The California Almanac of Emissions and Air Quality* (ARB 2009: 1-9, 1-12), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (DPM, a subset of PM_{10} emissions). DPM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although DPM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, no ambient monitoring data are available for DPM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies on chemical speciation to estimate concentrations of DPM.

Of the TACs for which data are available in California, DPM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest existing ambient risks (ARB 2009a:5-2–5-5). DPM poses the greatest health risk among these 10 TACs. Health risks associated with DPM are expected to drop by the year 2020 due to implementation of ARB's heavy duty vehicle regulations and Diesel Risk Reduction Plan (ARB 2009a:5-42–5-44).

DPM emissions are estimated to be 2,590 tons/year in the SVAB, which constitutes approximately 7% of the DPM emissions in the state (ARB 2009a:5-82). Based on receptor modeling techniques, ARB estimated health risks from DPM exposure to be 360 excess cancer cases per million people in the SVAB in the year 2000 (ARB 2009a:5-83). Since 1990, the health risk associated with DPM has been reduced by 52% in the SVAB. Overall, levels of most TACs, except for *para*-dichlorobenzene and formaldehyde, have decreased since 1990 in the SVAB (ARB 2009a:5-83–5-84).

Several stationary sources of TACs exist in the city and county of Sacramento, including manufacturers of foods, chemicals, building products, and fabrics; hospitals; crematoriums; quarries; and petroleum storage and terminals (ARB 2010f).

SMAQMD recommends a discussion of whether the project would locate new receptors in close proximity to an existing or future planned source of TAC emissions (SMAQMD 2009:5-3). The only stationary sources of TACs in the vicinity of the SPA are the Kiefer Landfill (described below in the "Existing Air Quality—Odors" section), and Triangle Rock Products, Inc., a construction sand and gravel company, which reported about 16,000 pounds per year (lbs/year) of crystalline silica emissions in 2008 or prior years (ARB 2010e, 2010f). The locations of both the Kiefer Landfill and Triangle Rock Products, Inc. are shown in Exhibit 3.2-2, and both are potentially upwind of the SPA when prevailing winds are from the southwest or southeast. Because quantitative health risk assessments (HRAs) were not required from either facility by SMQAMD, the SMAQMD's prioritization thresholds were presumably not exceeded by the facilities, and therefore it is presumed that neither facility results in substantial health risks to nearby areas (ARB 2010e, 2010f).

SENSITIVE RECEPTORS

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. These people include children, the elderly, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Structures that house these persons or places where they gather are defined as sensitive receptors.

Residential areas are considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposures to any pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution even though exposure periods during exercise may be short. In addition, noticeable air pollution can detract from the enjoyment of recreation. Commercial and industrial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

The ARB defines sensitive receptors as residential uses, schools, daycare centers, playgrounds, and health care facilities (including hospitals and nursing homes) (ARB 2005a:ES-1). There are currently no sensitive receptors in the SPA.

EXISTING AIR QUALITY—ODORS

Typically odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant or bakery) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

SMAQMD lists several examples of common land use types that typically generate substantial odor impacts including, but not limited to: wastewater treatment plants, landfills, composting/green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting/coating operations, rendering plants, and food packaging plants.

Sources of odors near the SPA include animal rendering (Sacramento Rendering Company, approximately ½ mile west of Sunrise Boulevard and Kiefer Boulevard, see Exhibit 3.2-2); composting (Lopez Ag Service, Inc. approximately ½ mile west of Sunrise Boulevard and Florin Road, see Exhibit 3.2-2); and waste disposal (Kiefer Landfill, approximately 2 miles southeast of the SPA, see Exhibit 3.2-2), all of which may be upwind of the SPA when the prevailing winds are from the west, southwest, or southeast. Approximately 375 complaints about odors were recorded by SMAQMD, and four notices of violation (2006) were issued to the Sacramento Rendering Company in the past five years (Sacramento County 2010). SMAQMD recorded no odor complaints about Kiefer Landfill or Lopez Ag Service, Inc. in the past 5 years. Specific information about the odor complaints, including where they occurred and whether they were confirmed or unconfirmed, was not available; however, SMAQMD generally considers odor sources to have a "substantial number of odor complaints" if they have had one confirmed complaint per year averaged over a 3-year period or three unconfirmed complaints per year averaged over a 3-year period (SMAQMD 2009:7-5).

Two of the three odor sources are close enough in proximity to the SPA that they violate SMAQMD's recommended odor screening distances from odor sources to sensitive receptors: Sacramento Rendering Company violates SMAQMD's recommended odor screening distance of 4 miles and Lopez Ag Service, Inc. is very near the recommended odor screening distance of 2 miles. Kiefer Landfill does not violate the recommended screening distance of 1 mile (SMAQMD 2009:7-4–7-5).

3.2.2 REGULATORY FRAMEWORK

CRITERIA AIR POLLUTANTS

Federal Plans, Policies, Regulations, and Laws

At the Federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish primary and secondary NAAQS (Table 3.2-1). The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The Federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA has responsibility for reviewing all state SIPs to determine conformation to the mandates of the CAAA and determine whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in application of sanctions to transportation funding and stationary air pollution sources in the air basin.

In addition, general conformity requirements were adopted by Congress as part of the CAAA and were implemented by EPA regulations in 1993. General conformity requires that all Federal actions conform to the SIP as approved or promulgated by EPA. The purpose of the general conformity program is to ensure that actions taken by the Federal government do not undermine state or local efforts to achieve and maintain NAAQS. Before a Federal action is taken, it must be evaluated for conformity with the SIP. All reasonably foreseeable emissions, both direct and indirect, predicted to result from the action are taken into consideration and must be identified as to location and quantity. If it is found that the action would create emissions above *de minimis* threshold levels specified in EPA regulations, or if the activity is considered regionally significant because its emissions exceed 10% of an area's total emissions, the action cannot proceed unless mitigation measures are specified that would bring the project into conformance.

General conformity applies in both Federal nonattainment and maintenance areas. Within these areas, it applies to any Federal action not specifically exempted by the CAA or EPA regulations. Emissions from construction activities are also included. General conformity does not apply to projects or actions that are covered by the transportation conformity rule. If a Federal action falls under the general conformity rule, the Federal agency responsible for the action is responsible for making the conformity determination. In some instances, a state will make the conformity determination under delegation from a Federal agency. Private developers are not responsible for making a conformity determination, but can be directly affected by a determination. General conformity with respect to the project will be determined within the record of decision.

State Plans, Policies, Regulations, and Laws

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish CAAQS (Table 3.2-1). The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Other ARB responsibilities include overseeing compliance with California and Federal laws by local air districts, approving local air quality plans, submitting SIPs to EPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

ARB and local air pollution control districts are currently developing plans for meeting new national air quality standards for ozone and $PM_{2.5}$. California's adopted 2007 State Strategy was submitted to EPA as a revision to the SIP in November 2007 (ARB 2010g).

Regional and Local Plans, Policies, Regulations, and Ordinances

Sacramento Metropolitan Air Quality Management District

SMAQMD attains and maintains air quality conditions in Sacramento County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of SMAQMD includes the preparation of plans for the attainment of ambient air-quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. SMAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA and amendments thereof (CAAA), and the CCAA.

SMAQMD's *Guide to Air Quality Assessment in Sacramento County* is an advisory document that provides lead agencies, consultants, and project applicant with uniform procedures for addressing air quality in environmental documents. A new version of the guide was released in December 2009 and supersedes the version released in July 2004 (SMAQMD 2009). Lead agencies must use the December 2009 CEQA guide beginning January 1, 2010, for all projects that have not released a draft environmental document for public review on or before that date. The 2009 version of the guide does not include the development of new thresholds of significance; however, it does include updated methodologies for evaluating potential impacts and a refined list of recommended mitigation measures. The 2009 guide contains the following applicable components:

- criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
- specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
- methods available to mitigate air quality impacts; and
- information for use in air quality assessments and EIRs that will be updated frequently, such as air quality data, regulatory setting, climate, and topography.

As mentioned above, SMAQMD adopts rules and regulations. All projects are subject to SMAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the project may include, but are not limited to, the following:

- **Rule 201: General Permit Requirements.** Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD before equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact SMAQMD early to determine whether a permit is required, and to begin the permit application process. Portable construction equipment (e.g., generators, compressors, pile drivers, lighting equipment) with an internal combustion engine over 50 horsepower (hp) are required to have a SMAQMD permit or ARB portable equipment registration.

- **Rule 402: Nuisance.** The developer and proposed project cannot emit any quantities of air contaminants or other materials that would cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public; or which endanger the comfort, repose, health, or safety of any persons or the public; or which cause or have natural tendency to cause injury or damage to business or property.

- **Rule 403: Fugitive Dust.** The developer or contractor is required to control dust emissions from earthmoving activities or any other construction activity to prevent airborne dust from leaving the SPA.

- **Rule 417: Wood Burning Appliances.** The developer or contractor is prohibited from installing any new, permanently installed, indoor or outdoor, uncontrolled fireplaces in new or existing developments.

- **Rule 442: Architectural Coatings.** The developer or contractor is required to use coatings that comply with the VOC content limits specified in the rule.

In addition, effective as of October 10, 2005, if modeled construction-generated emissions for a project are not reduced to SMAQMD's threshold of significance (85 lb/day of NO_X) by applying the standard construction mitigation measures, then an off-site construction mitigation fee is recommended. The fee must be paid before a grading permit can be issued. This fee is used by SMAQMD to purchase off-site emissions reductions. Such purchases are made through SMAQMD's Heavy Duty Incentive Program, through which select owners of heavy-duty equipment in Sacramento County can repower or retrofit their old engines with cleaner engines or technologies. SMAQMD provides a Mitigation Fee Calculator for determining the fee for construction projects when off-site mitigation is needed (SMAQMD 2010).

Air Quality Plans

As described previously, the Sacramento region is currently designated as a both a Federal and state nonattainment area for ozone and particulate matter. The CAA requires plans which identify how Federal nonattainment areas will attain and/or maintain the NAAQS. The CAA requires EPA to review each plan and any plan revisions and to approve the plan or plan revisions if consistent with the CAA. Additionally, the CCAA requires air districts to develop attainment plans to meet the CAAQS by the earliest practicable date.

Key elements of these plans include emission inventories, emission control strategies and rules, air quality data analyses, modeling, air quality progress, and attainment or maintenance demonstrations.

Federal 1-Hour Ozone (Revoked Standard)

On November 6, 1991, the Sacramento region was designated a "serious" nonattainment area for the 1-hour ozone NAAQS with a November 15, 1999 attainment deadline. The Sacramento Federal Nonattainment Area (SFNA) included Sacramento and Yolo Counties, Placer and El Dorado Counties (except Lake Tahoe Basin portions), Solano County (eastern portion), and Sutter County (southern portion). The 1994 Sacramento Area Regional Ozone Attainment Plan (OAP) was prepared and demonstrated that a comprehensive control strategy to reduce VOC and NO_X emissions could achieve the ozone standard by 2005. In response, EPA granted a reclassification request from a "serious" area to a "severe" area with an extended attainment deadline of November 15, 2005, and approved the 1-hour ozone plan in 1997.

As a "severe nonattainment" area, the Sacramento Region was required to submit rate-of-progress milestone evaluations per Section 182(g) of the Federal Clean Air Act. SMAQMD prepared milestone reports for 1996, 1999, and 2002.

In 2004, EPA published the Phase 1 Rule to implement the 1997 8-hour ozone NAAQS which revoked the 1-hour ozone NAAQS effective June 15, 2005. In 2009, the AQMD submitted a request to exclude certain 1-hour exceedances due to elevated ozone levels caused by wildfires from June 21, 2008 through August 11, 2008. In the following year, the region requested EPA to make a formal attainment determination for the Sacramento nonattainment area based on the exclusion of these exceedances.

Federal 8-Hour Ozone (1997 NAAQS)

Sacramento County and the western portion of El Dorado County are also part of the SFNA, which also comprises of Yolo County and portions of Placer, and Solano Counties. As a nonattainment area, the region is also required to submit Rate of Progress Plans (ROPs) in accordance with the CAAA. Milestone reports were prepared for 1996, 1999, 2002, and most recently in 2006 for the 8-hour ozone standard. The 2008 Rate of Progress Plan included 2008 motor vehicle emission budgets for transportation conformity purposes and documented an updated emissions inventory for the region; EPA found the 2008 motor vehicle emission budgets adequate for transportation conformity purposes on March 29, 2006, but has not approved the plan to date.

The Sacramento region was classified by EPA on June 15, 2004, as a "serious" nonattainment area for the national 8-hour ozone standard with an attainment deadline of June 15, 2013. Emission reductions needed to achieve the air quality standard were identified based on air quality modeling. An evaluation of proposed new control measures and associated ROG and NO_X emission reductions concluded that no set of feasible controls was available to provide the needed emission reductions before the attainment deadline year. Given the magnitude of the shortfall in emission reductions and the schedule for implementing new control measures, the earliest possible attainment demonstration year for the Sacramento region is determined to be the "severe" area deadline of 2019.

Section 181(b)(3) of the CAA permits a state to request that EPA reclassify a nonattainment area to a higher classification and extend the time allowed for attainment. This process is appropriate for areas that must rely on longer term strategies to achieve the emission reductions needed for attainment.

The board of directors for each of the five air districts (including SMAQMD) that compose the SFNA requested that ARB submit a formal request for voluntary reclassification from "serious" to "severe" for the 8-hour ozone nonattainment area with an associated attainment deadline of June 15, 2019. ARB submitted that request on February 14, 2008, and the EPA approved the reclassification on May 5, 2010.

SMAQMD released a draft version of the 8-Hour Ozone 2011 Reasonable Further Progress Plan for the SFNA in February, 2008. On March 24, 2008, EPA published in the *Federal Register* a finding of Failure to Submit the 2011 Reasonable Further Progress Plan. The failure to submit finding triggered the following sanctions clocks:

- **Offset sanctions:** More stringent emission mitigation requirements for new and modified businesses, "major stationary sources," if a complete plan is not submitted within 18 months after EPA's finding of failure to submit the plan.
- **Federal highway funding sanctions:** Prohibiting transportation projects from receiving Federal transportation funding if a complete plan is not submitted within 24 months after EPA findings.

The sanctions clocks will stop once the air districts (including SMAQMD) submit the *2011 Reasonable Further Progress Plan* and EPA accepts the plan as complete. The SFNA submitted the plan to the EPA on July 7, 2008. On September 19, 2008, the EPA determined that the plan conforms to the completeness criteria in Title 40 of the Code of Federal Regulations, Part 51, Appendix V, which stops the sanction clocks under the CAA (SMAQMD 2008a and b).

The 2009 Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan was approved on December 19, 2008. The updated plan documents that the region is meeting requirements of the Clean Air Act for the 1997 8-hour ozone standard, including meeting minimum emission reductions and reaching the air quality standard not later than 2018. The plan included an updated emission inventory and established new emission budgets for transportation and general conformity; it also included commitments to adopt and implement new reasonably available control measures. On July 28, 2009, EPA determined the motor vehicle emission budgets for 2011, 2014, and 2017 to be adequate but found the budgets for 2018 inadequate; the plan is pending approval by the EPA.

Federal 8-Hour Ozone (2008 NAAQS and 2010 Reconsideration)

On March 12, 2008, EPA strengthened its NAAQS for ground-level ozone, the primary component of smog. These changes will improve both public health protection and the protection of sensitive trees and plants. EPA revised the 8-hour "primary" ozone standard, designed to protect public health, to a level of 0.075 ppm. The previous standard, set in 1997, was 0.08 ppm.

EPA also strengthened the secondary 8-hour ozone standard to the level of 0.075 ppm making it identical to the revised primary standard. In addition, EPA changed the Air Quality Index (AQI) to reflect the new primary standard. The AQI is EPA's color-coded tool designed for use by state and local authorities to inform the public about daily air pollution levels in their communities.

On January 6, 2010, EPA proposed to reconsider the 2008 NAAQS for ground-level ozone. The proposed revisions are based on a reevaluation of the scientific evidence about ozone and its effects on people and the environment. EPA is proposing to strengthen the 8-hour "primary" ozone standard, designed to protect public health, to a level within the range of 0.060-0.070 ppm. EPA is also proposing to establish a distinct cumulative, seasonal "secondary" standard, designed to protect sensitive vegetation and ecosystems, including forests, parks, wildlife refuges, and wilderness areas. EPA is proposing to set the level of the secondary standard within the range of 7-15 ppm-hours.

State 1-Hour Ozone

The Sacramento region is designated a nonattainment area for the state 1-hour and 8-hour ozone standards, and SMAQMD is required to undertake planning efforts to reach this health-based standard at the county level (i.e., Sacramento County, among others, which are also part of the SFNA).

SMAQMD, in coordination with the air quality management districts and air pollution control districts of El Dorado, Placer, Solano, Sutter, and Yolo Counties, prepared and submitted the 1994 *Air Quality Attainment Plan* (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and, to a lesser extent, CO and PM_{10}.

The CCAA also requires annual progress reports and triennial assessments of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections.

The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the 1994 OAP, which stressed attainment of ozone standards and focused on strategies for reducing ROGs and NO_X.

Federal PM

PM_{10}

In 2002, EPA officially determined that Sacramento County had attained the PM_{10} NAAQS based on PM_{10} air quality monitoring data recorded during 1998 to 2000, which showed no measured exceedances of the 24-hour PM_{10} NAAQS or violations of the annual standard between 1998 and 2000. The current air monitoring network includes seven PM_{10} stations throughout Sacramento County, and there have not been any measured violations of the PM_{10} NAAQS to date.

To reclassify Sacramento County as attainment for the national PM_{10} standards, SMAQMD submitted their PM_{10} Implementation/Maintenance Plan and Redesignation Request for Sacramento County on October 28, 2010. The plan shows that the 1987 standard for PM_{10} was attained and establishes the strategy for maintaining the standard through 2022.

$PM_{2.5}$

On October 16, 2006, the EPA promulgated a new 24-hour standard for $PM_{2.5}$, which lowered the daily standard from 65µg/m3 to 35$\mu g/m^3$ to protect the general public from short term exposure of the fine particulate matter. Because Sacramento County does not meet the new standards, in October, 2007, the Air District completed a boundary analysis based on the EPA's nine factor requirements. In December, 2007, the California ARB made their recommendations to the EPA for the nonattainment area boundary.

The EPA Administrator signed the final $PM_{2.5}$ nonattainment designations for Sacramento on October 8, 2009, and an attainment plan must be submitted not later than 3 years after the effective date of the designation, which must include transportation conformity budgets and control measures.

State PM

In 2003, the California Legislature enacted Senate Bill 656 (Sher, Health and Safety Code Section 39614) to reduce adverse health impacts, including development of lung and heart disease and premature death from exposure to particulate matter levels above the state ambient air quality standards.

SB 656 required ARB to develop a list of the most readily available, feasible, and cost-effective control measures that could be employed to reduce PM emissions. The ARB list is based on California rules and regulations existing as of January 1, 2004, and was adopted by ARB in November 2004. Subsequently, under SB 656, each air district is required to prioritize the measures identified by ARB, based on the cost effectiveness of the measures and their effect on public health, air quality, and emission reductions. On July 28, 2005, SMAQMD adopted an implementation schedule for the most cost-effective measures.

Sacramento County General Plan

The goals, objectives, and policies from the *Sacramento County General Plan* (1996) regarding air quality and odors that are applicable to the Proposed Project and other alternatives under consideration are listed in Appendix K.

City of Rancho Cordova General Plan

Goals and policies from the *City of Rancho Cordova General Plan* (City General Plan 2006) relating to air quality and odors that are applicable to the Proposed Project and other alternatives under consideration are listed in Appendix K.

TOXIC AIR CONTAMINANTS

TACs are not considered criteria air pollutants and are not specifically addressed through the setting of ambient air quality standards. Instead, EPA and ARB regulate hazardous air pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology (MACT and BACT) to limit emissions. These in conjunction with additional rules set forth by SMAQMD establish the regulatory framework for TACs (see discussion under "State and Local Toxic Air Contaminant Programs" below).

Federal Hazardous Air Pollutant Program

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAPs). The NESHAPs for major sources of HAPs may differ from those for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (tpy) of any HAP or more than 25 tpy of any combination of HAPs; all other sources are considered area sources.

The CAAA called on EPA to promulgate emissions standards in two phases. In the first phase (1992–2000), EPA developed technology-based emissions standards designed to reduce emissions as much as feasible. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase, EPA promulgated health risk–based emissions standards were deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions of, at a minimum, benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the CAAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Toxic Air Contaminant Programs

TACs can be separated into carcinogens and non-carcinogens based on the nature of the effects associated with exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which health impacts would not occur and cancer risk is expressed as excess cancer cases per one million exposed individuals. Non-carcinogens differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis. Acute and chronic exposure to non-carcinogens is expressed in using a Hazard Index (HI), which is the ratio of expected exposure levels to acceptable health-acceptable exposure levels.

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [Chapter 1047, Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588

[Chapter 1252, Statutes of 1987]). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, particulate matter emissions from diesel exhaust was added to the ARB list of TACs.

After a TAC is identified, ARB then adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions; for example, the ATCM limits truck idling to 5 minutes (Title 13, Section 2485 of the California Code of Regulations).

The Air Toxics Hot Spots Information and Assessment Act requires that toxic air emissions from stationary sources be quantified and compiled into an inventory according to criteria and guidelines developed by the ARB, that each facility be prioritized to determine whether a risk assessment must be conducted, that the risk assessments be conducted according to methods developed by OEHHA, that the public be notified of "significant risks" (as defined by OEHHA) posed by nearby facilities, and that emissions which result in a significant risk be reduced. Since the amendment of the statute in 1992 by enactment of Senate Bill (SB) 1731, facilities that pose a potentially significant health risks to the public are required to reduce their risks, thereby reducing the near-source exposure of Californians to toxic air pollutants. Owners of facilities found to pose significant risks by a district must prepare and implement risk reduction audit and plans within six months of the determination.

ARB has adopted control measures for DPM and more stringent emissions standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new rule for public-transit bus fleets and emissions standards for new urban buses. These new rules and standards include all the following elements:

- more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines;
- zero-emission bus demonstration and purchase requirements applicable to transit agencies; and
- reporting requirements, under which transit agencies must demonstrate compliance with the public-transit bus fleet rule.

Recent and future milestones include the low-sulfur diesel fuel requirement and tighter emissions standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, replacing older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1,3-butadiene, DPM) have been appreciably reduced over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, it is expected that DPM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year-2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

In addition, the *Air Quality and Land Use Handbook: A Community Health Perspective*, published by ARB, provides guidance on land use compatibility with sources of TACs (ARB 2005a). The handbook is not a law or adopted policy but offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help protect children and other sensitive members of the population. In addition, for projects that would site receptors in close proximity to major roadways, lead agencies are directed to use the SMAQMD's *Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways* (*Protocol*). The Protocol was developed to provide further guidance on ARB's Land Use Handbook to assist local land use jurisdictions in assessing the potential cancer risk of siting sensitive land uses adjacent to major roadways (SMAQMD 2009:5-10).

SB 352 (California Education Code Section 17213, California Public Resources Code Section 21151.8) expands on previous requirements for the review of TAC sources near school sites. Accordingly, SB 352 requires that any school site located within 500 feet of the edge of the closest travel lane of a freeway or other busy traffic corridor be reviewed for potential health risks.

At the local level, air pollution control or management districts may adopt and enforce ARB control measures. The siting of new stationary sources of TACs is subject to SMAQMD Rule 202 (New Source Review). Each new stationary source is evaluated to determine whether it has the potential to emit TACs. SMAQMD assesses the impact from TACs based on its guidance document—Supplemental Risk Assessment Guidelines for New and Modified Sources—as well guidance documents from OEHHA, ARB, and the California Air Pollution Control Officers Association. SMAQMD requires emission controls, similar to BACT, called Toxic Best Available Control Technology (T-BACT) for certain sources.

In addition to T-BACT requirements, permits for equipment that may emit TACs may also contain conditions required by the NESHAPs and ATCMs promulgated by the EPA and ARB, respectively (Rules 801 and 904). In short, a new stationary source of TACs would not receive the authority to construct or permit to operate if it would result in:

- an incremental increase in cancer risk greater than 10 in one million at any off-site receptor; and/or
- an off-site ground-level concentration of non-carcinogenic TACs generated from the project that would result in an HI greater than 1 (unless approved by OEHHA).

These permitting requirements are identical to SMAQMD's thresholds of significance for TACs generated by stationary sources or land uses that included nonpermitted sources (e.g., truck distribution yards). Therefore, lead agencies can determine that a new stationary source of TACs that attains the authority to construct and permit to operate from the SMAQMD would not exceed the applicable TAC thresholds of significance. (SMAQMD 2009:5-7).

If a source cannot reduce the risk below the threshold of significance even after T-BACT has been implemented, the SMAQMD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology for controlling TACs when retrofitting emissions sources.

It is important to note that the air quality permitting process applies only to stationary sources; properties that may be exposed to elevated levels of TACs from nonstationary sources (e.g., high traffic-volume roadways, truck yards) and the nonstationary sources themselves are not subject to this process or to any requirements of T-BACT implementation. Rather, emissions controls on nonstationary sources are subject to regulations implemented on the state and Federal level.

Odors

SMAQMD adopted a nuisance rule that addresses odor exposure. Rule 402 states that no person shall discharge from any source whatsoever such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons, or to the public, or that endanger the comfort, repose, health, or safety of any such persons, or the public, or that cause to have a natural tendency to cause injury or damage to business or property. The provisions of Rule 402 do not apply to odors emanating from agricultural operations necessary for the growing of crops or raising of fowl or animals.

SMAQMD recommends that odor impacts be addressed in a qualitative manner and include a discussion about whether the project would result in excessive nuisance odors, as defined under the California Code of Regulations and Section 41700 of the California Health and Safety Code, and thus would constitute a public nuisance related to air quality.

Two situations increase the potential for odor problems. The first occurs when a new odor source is located near existing sensitive receptors. The second occurs when new sensitive receptors are developed near existing sources of odors. In the first situation, SMAQMD recommends operational changes, add-on controls, process changes, or buffer zones where feasible to address odor complaints. In the second situation, the potential conflict is considered substantial if the new sensitive receptor is at least as close as any other site that has already experienced substantial odor problems related to the odor source. For projects being developed near a source of odors where there is no nearby development that may have filed complaints, and for odor sources being developed near existing sensitive receptors, SMAQMD recommends that the determination of potential conflict be based on the distance and frequency at which odor complaints from the public have occurred in the vicinity of a similar facility.

Odors in Sacramento County are regulated by SMAQMD, although there are no specific rules or standards related to odor emissions. Any actions related to odors are based on citizen complaints to local governments and/or SMAQMD.

3.2.3 Environmental Consequences and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended and guidance from SMAQMD. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or other alternatives under consideration were determined to result in a significant impact related to air quality and odors if they would do any of the following:

- conflict with or obstruct implementation of the applicable air quality plan,
- violate any air quality standard or contribute substantially to an existing or projected air quality violation,
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable NAAQS or CAAQS (including releasing emissions that exceed quantitative thresholds for ozone precursors),
- expose sensitive receptors to substantial pollutant concentrations, or
- create objectionable odors affecting a substantial number or people.

As stated in Appendix G, the significance criteria established by the applicable air quality management district may be relied on to make the above determinations. Thus, in accordance with SMAQMD-recommended thresholds for evaluating project-related air quality impacts (SMAQMD 2009), implementation of the Proposed Project or other alternatives under consideration would result in a significant impact if operation of the Proposed Project or other alternatives under consideration would:

- generate construction-related criteria air pollutant or precursor emissions that exceed the SMAQMD-recommended threshold of 85 lb/day for NO_X, or result in or substantially contribute (at a level equal to or greater than 5%) to emissions concentrations of PM_{10} and $PM_{2.5}$ that exceed the NAAQS or CAAQS (e.g., 50 micrograms per cubic meter [$\mu g/m^3$] [24-hr] or 20 $\mu g/m^3$[annual arithmetic mean] for PM_{10} and 12 $\mu g/m^3$[annual arithmetic mean] for $PM_{2.5}$);
- generate long-term regional criteria air pollutant or precursor emissions that exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, or result in or substantially contribute (at a level

equal to or greater than 5%) to emissions concentrations of PM_{10} and $PM_{2.5}$ that exceed the NAAQS or CAAQS (e.g., 50 µg/m^3 [24-hr] or 20 µg/m^3[annual arithmetic mean] for PM_{10} and 12 µg/m^3[annual arithmetic mean] for $PM_{2.5}$);

- contribute to localized concentrations of air pollutants at nearby receptors that would exceed applicable ambient air quality standards;

- Stationary sources and sources hosting large numbers of diesel trucks (i.e., loading docks or delivery areas associated with foreseeable commercial or retail land uses) that expose sensitive receptors to TAC emissions that exceed an incremental increase of 10 in 1 million for the carcinogenic risk (i.e., the risk of contracting cancer) and/or a noncarcinogenic HI of 1.0 for the Maximally Exposed Individual (MEI, for stationary source TAC emissions); or

- expose sensitive receptors to excessive nuisance odors generated by the project, as defined under SMAQMD Rule 402 (see "Odors" under "Regional and Local Plans, Policies, Regulations, and Ordinances" above).

- For mobile TAC sources, that is, freeways, high-volume roadways, or roadways hosting larger-than-average percentages of diesel trucks, the threshold of significance that will be used for the purposes of this DEIR/DEIS is 276 excess cancers in a million (SMAQMD 2011). The significance threshold selected for this DEIR/DEIS is a conservative approach based on the worst reasonable case location for new sensitive receptors within Sacramento County. The 276 excess cancer cases in one million is based on a hypothetical sensitive receptor located 50 feet from the edge of the nearest travel lane for the highest peak traffic volume reported by Caltrans for Sacramento County, reduced by 70% (SMAQMD 2011). For comparison, the ARB estimated health risk from TACs to be 360 excess cancer cases per million people in the Sacramento Valley Air Basin (ARB 2005b, 2009a). The 70-percent reduction in risk is the same that was used in ARB's publication, *Air Quality and Land Use Handbook: A Community Health Perspective*, to recommend that sensitive land uses be buffered by at least 500 feet from a freeway or major roadway (ARB 2005). This recommendation "was based on traffic related studies that showed a 70 percent drop in PM concentrations at a distance of 500 feet from the roadway." (ARB 2011)

Buffer distances (or other necessary TAC mitigation) would be largest for the reduction of cancer risk, as compared to those buffer distances/measures required to mitigate more acute health risks represented by the HI (Bay Area Air Quality Management District [BAAQMD] 2010). For this reason, the HI will not be used for determination of significance for the impact of exposure of sensitive receptors to TACs from freeways, high-volume roadways or roadways hosting larger-than-average percentages of diesel trucks.

ANALYSIS METHODOLOGY

Temporary and short-term construction-generated emissions of criteria air pollutants and ozone precursors were assessed in accordance with methods recommended by SMAQMD. It is common CEQA and NEPA practice to examine certain types of air pollutants within the context of a single impact analysis. Ozone precursor emissions (NO_X and ROG) and particulate matter emissions (PM_{10}, $PM_{2.5}$) are addressed together under the temporary and short-term, construction-related impact (3.2-1) and the long-term, operational impact (3.2-2) because:

(1) all of these pollutants have related potential public health effects and the basis of the impact analysis is the level of potential public health effects;

(2) the combined analysis allows for a clearer and more complete answer to three related "Appendix G" CEQA Guidelines questions under Section III, "Air Quality": a) conflicts with air quality plans; b) violations of an air quality standard; and c) cumulatively considerable increase in criteria air pollutant in nonattainment area;

(3) the sources of these emissions and the secondary formation of these pollutants that can result in public health impacts are related to one another; and

(4) mitigation measures developed to address these pollutants are also related.

Where quantification was required, emissions were modeled using the URBEMIS 2007 Version 9.2.4 computer program (Rimpo and Associates 2008), as recommended by SMAQMD's *Guide to Air Quality Assessment in Sacramento County* (SMAQMD 2009). URBEMIS was used to determine whether temporary and short-term construction-related emissions of criteria air pollutants associated with development of the Proposed Project and the other four action alternatives under consideration would exceed applicable thresholds and where mitigation would be required to reduce the magnitude of the impact. Modeling was based on project-specific data, when available. However, when project-specific information (e.g., amount of land to be disturbed/graded per day, types of equipment to be used, number of construction employees) was not available, reasonable assumptions and default settings were used to estimate criteria air pollutant emissions. Information about grading activities and the locations and occupancy timing of future receptors is not known at the time of writing this EIR/EIS.

A detailed list of modeling assumptions is provided in Appendix L. Predicted temporary and short-term construction-generated emissions were compared with applicable SMAQMD thresholds for determination of significance. Although the primary purpose of estimating daily construction emissions is to analyze the project with respect to the SMAQMD's mass emission threshold for construction-generated NO_X, the SMAQMD also recommends reporting the emissions of ROG, PM_{10}, $PM_{2.5}$ and CO_2 for the purposes of added disclosure to readers of the environmental impact analysis (SMAQMD 2009:3-4).

It is assumed that development of the SPA would occur over a large area (approximately 1,250 acres, about 1,017 acres of which would be graded), and would occur in three phases over the course of 20 years (6.67 years per phase). Large portions of the SPA, the largest being 570 acres or 56% of the total graded area, would undergo construction during a single phase, which would require substantial amounts of earthwork and grading.

Apart from the general construction phasing map (Exhibit 2-22, Chapter 2.0, "Alternatives"), a more detailed schedule describing the timing and location of construction activities under the Proposed Project and the other four action alternatives was not available at the time of writing this EIR/EIS. Construction of the site is anticipated to commence in 2012 and last until approximately 2032.

Given that exhaust emission rates of the construction equipment fleet are expected to decrease over time due to State and SMAQMD-led efforts, maximum daily construction emissions were estimated using the earliest calendar when construction would begin (i.e., 2012) in order to generate conservative estimates. It is anticipated, however, that in later years, advancements in engine technology, retrofits, and turnover in the equipment fleet would result in lower levels of emissions. Accordingly, maximum daily construction emissions in 2012 for the Proposed Project and the other four action alternatives were estimated using the URBEMIS 2007 Version 9.2.4 computer program (Rimpo and Associates 2008). URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information including building size, land use and type, disturbed acreage, as well as seasons and years in which construction occurs. Project-generated emissions of criteria air pollutants (e.g., PM_{10}) and precursors (i.e., ROG and NO_X) were modeled based on general information provided in the project description (see Chapter 2, "Alternatives), and default SMAQMD-recommended settings and parameters attributable to the proposed land use types and site location. URBEMIS also divides construction activity into distinct construction phases: site grading, asphalt paving, building construction, and the application of architectural coatings.

To provide a conservative estimate of annual construction emissions for the Proposed Project and the other action alternatives, phase two of construction, having the largest area, was assumed to commence in 2012 rather than 2019, and occur over a period of 6.67 years. All construction activity sub-phases were assumed to occur simultaneously over the course of a year during the typical dry months (May to October). Because of the size of the project and the extended period until full buildout, it is likely that the different types of construction activities (i.e. site grading, trenching, asphalt paving, building construction, and application of architectural coatings) could occur simultaneously at various locations within each phase and sub-phase of the SPA (see Exhibit 2-22, Chapter

2.0, "Alternatives"). In other words, site grading, asphalt paving, building construction, and the application of architectural coatings could take place within defined areas of the SPA at the same time during each of the three construction phases.

Construction emissions levels associated with the Proposed Project and the other action alternatives would differ according to the total number of residential units, commercial square footage, office square footage, and school square footage to be developed. Thus, for the Proposed Project and the other action alternatives, the subtotal quantities of all land use types were multiplied by 0.56 and divided by 6.67 years to calculate the annual average level of annual construction activity (e.g., residential units, commercial square footage). This corresponds with the largest identified construction phase, which represents 56% of the total graded area and which would undergo construction during an estimated 6.67-year construction schedule.

With respect to construction-generated emissions of PM_{10}, SMAQMD typically recommends that project-level analyses determine the maximum concentration of PM_{10} emissions by performing air dispersion modeling with the EPA's AERMOD model if the maximum daily acreage of ground disturbance would exceed 15 acres. Given the construction schedule and phases, it is possible, but unlikely that more than 15 acres of ground disturbance activity would occur in one day (85 graded acres per year is a conservative estimate, assuming construction only occurs 22 days per month for 6 months per year, resulting in an average graded area of 0.65 acres per day). By contrast, URBEMIS assumes 25% of 85 acres is graded per day.

Long-term (i.e., operational) regional emissions of criteria air pollutants and precursors, including mobile- and area-source emissions, were also quantified using the URBEMIS 2007 Version 9.2.4 computer model (Rimpo and Associates 2008) assuming that full buildout of the project would occur in the year 2032. The year 2032 was used in URBEMIS as the project buildout year; however, the year 2030 was used to calculate mobile-source emissions within URBEMIS because analysis years could only be selected in five-year increments. Area-source emissions were modeled according to the size and type of land uses proposed under all five action alternatives. Mobile-source emissions were modeled based on the net increase in daily vehicle trips and the net increase in regional VMT that would result from full build out of all five action alternatives. VMT and trip parameters were obtained from the traffic analysis prepared by Fehr & Peers (2010). Predicted long-term operational emissions were compared with applicable SMAQMD thresholds for determination of significance.

Long-term operational exposures of sensitive receptors to emissions of TACs was assessed qualitatively. For the purposes of evaluating health risks, the guidance contained in ARB's *Air Quality and Land Use Handbook: A Community Health Perspective,* was used. The *Air Quality and Land Use Handbook* includes recommendations for the siting of sensitive receptors near facilities associated with TAC emissions, such as freeways and high-traffic roads, commercial distribution centers, dry cleaners, gasoline stations, and industrial facilities (ARB 2005). Additionally, guidance contained within SMAQMD's *Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways, Version 2.4* (SMAQMD 2011) was used to assess exposures of sensitive receptors to nearby, off-site mobile sources (i.e., Sunrise Blvd., Grant Line Road and SR 16). Neither of the abovementioned guidance documents is regulatory, and neither claims to provide significance thresholds for the health risks associated with exposures of sensitive receptors to nonpermitted sources of TACs; therefore, they are not used for that purpose. Ultimately, the impact conclusion is based on whether the Proposed Project or other action alternatives would result in exposures of sensitive receptors to substantial levels of TACs, based on location, source strength, exposure duration, and meteorology/dilution during transport from source to receptor. Other important factors to consider include the estimated TAC exposure levels at proposed sensitive receptors compared to background levels in the SVAB and the necessity to disclose an accurate understanding of the potential health risks so they can be considered in the planning process.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual

Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

Decisions concerning the project's conformity with the Federal Clean Air Act (i.e., the "conformity analysis") will be made in the USACE record of decision.

IMPACT 3.2-1	**Generation of Temporary and Short-Term Construction-Related Emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$.** *Project-generated construction activities would result in temporary and short-term emissions of ROG and NO_X, ozone precursors, fugitive PM dust and PM exhaust. Emissions of NOx would exceed SMAQMD-recommended thresholds and PM could substantially contribute to localized concentrations that exceed the NAAQS and CAAQS. Thus, project-generated, construction-related emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, and/or conflict with air quality planning efforts.*

NP

Because the project would not be implemented under the No Project Alternative, **no direct** or **indirect** project-related impacts would occur related to construction emissions of NO_X and PM_{10}. ***[Lesser]***

NCP

Construction emissions are considered temporary and short term in duration, but have the potential to represent a significant air quality impact. Respirable particulate matter (PM_{10}) and $PM_{2.5}$ are among the pollutants of greatest concern during construction activities. Particulate emissions from construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and soiling of exposed surfaces.

Particulate emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction emissions of PM_{10} and $PM_{2.5}$ can vary greatly depending on the level of activity, the specific operations taking place, the number and types of equipment operated, local soil conditions, weather conditions, and the amount of earth disturbance (e.g., site grading, excavation, cut-and-fill).

Emissions of ozone precursors, ROG and NO_X, are primarily generated from mobile sources and vary as a function of vehicle trips per day associated with delivery of construction materials, the importing and exporting of soil, vendor trips, and construction worker commute trips; and the types and number of heavy-duty, off-road equipment used and the intensity and frequency of their operation. A large portion of construction-related ROG emissions also result from the application of asphalt and architectural coatings and vary depending on the amount of coatings and paving applied each day.

Development of the SPA would occur over a large area and would require substantial amounts of earthwork and grading.

Table 3.2-4 summarizes the modeled worst-case daily emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ associated with construction of the No USACE Permit Alternative and the other four action alternatives. Refer to Appendix L for a detailed summary of the URBEMIS modeling assumptions, inputs, and outputs.

As shown in Table 3.2-4, the maximum daily level of construction-generated NO_X emissions under the No USACE Permit Alternative would not exceed the SMAQMD-recommended threshold of 85 lb/day. It should be noted that for purposes of this analysis, the maximum daily emissions level estimates displayed in Table 3.2-4 assume that the intensity of construction activity would be the same during the 20 years of construction on the site.

Table 3.2-4 Summary of Modeled Maximum Daily Criteria Air Pollutant and Precursor Emissions Associated with Construction Activities						
Source	**Emissions (lb/day)[1,2]**					
	ROG	**NO_X**	**PM_{10}(Dust)**	**$PM_{2.5}$(Dust)**	**PM_{10}(Exhaust)**	**$PM_{2.5}$(Exhaust)**
No USACE Permit Alternative						
Unmitigated	153	94	283	59	6	5
Mitigated [3]	—	75	71	—	3	—
Proposed Project Alternative						
Unmitigated	194	141	428	89	8	7
Mitigated [3]	—	113	107	—	4	—
Biological Impact Minimization Alternative						
Unmitigated	157	107	348	73	6	6
Mitigated [3]	—	86	87	—	3	—
Conceptual Strategy Alternative						
Unmitigated	172	110	392	82	7	6
Mitigated [3]	—	88	98	—	4	—
Increased Development Alternative						
Unmitigated	266	145	487	102	8	7
Mitigated [3]	—	116	122	—	4	—
SMAQMD Significance Threshold[3]	—	85	50 $\mu g/m^3$ 24-hour standard; 20 $\mu g/m^3$ Annual Arithmetic Mean	12 $\mu g/m^3$ Annual Arithmetic Mean	Threshold is for total dust + exhaust	Threshold is for total dust + exhaust

Notes: ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; lb/day = pounds per day; SMAQMD = Sacramento Metropolitan Air Quality Management District; $\mu g/m^3$ = micrograms per cubic meter

1 Maximum daily construction emissions are representative of a summer construction day in the earliest construction year (2012) assuming that all types of construction activities (i.e., grading, asphalt paving, building construction, and architectural coatings) would take place simultaneously at various locations of the Specific Plan Area. The detailed breakdown of land use types and other input parameters used in the modeling, as well as detailed modeling output, are included in Appendix L.

2 The mitigated total reflects a 75% reduction in fugitive PM_{10} dust emissions, a 45% reduction in PM_{10} exhaust emissions from off-road diesel equipment, and a 20% reduction in NO_X emissions from off-road diesel equipment, as required by Mitigation Measure 3.2-1a, but not the purchase of offsets for NO_X, as required by Mitigation Measure 3.2-1b. Reduction levels that would result from other measures listed under Mitigation Measure 3.2-1a cannot be quantified. The purchase of offsets for NO_X, as required by Mitigation Measure 3.2-1b, however, would ensure that NO_X would be reduced to 85 lb/day.

3 SMAQMD does not have mass emissions thresholds for construction-related emissions of ROG, PM_{10}, or $PM_{2.5}$. California ambient air quality standards (CAAQS) and national ambient air quality standards (NAAQS) do not distinguish between type of PM, only size (i.e. 10 microns vs. 2.5 microns). After the analysis of mass PM emissions for this EIR/EIS was prepared, SMAQMD released new concentration-

Source	Emissions (lb/day)[1,2]					
	ROG	NO_X	PM_{10}(Dust)	$PM_{2.5}$(Dust)	PM_{10}(Exhaust)	$PM_{2.5}$(Exhaust)

based significance thresholds for PM_{10} and $PM_{2.5}$. The new thresholds would not change the conclusions in this EIR/EIS because SMAQMD assumes that projects would not exceed the new thresholds if they implement all Basic Construction Emission Control Practices and no more than 15 acres is disturbed in a day. For disclosure purposes, mass PM emissions are reported. Although SMAQMD does not have a separate short-term, construction-related threshold for ROG, according to the SMAQMD CEQA Guidelines, "The District addresses construction-related emissions of ROG through Rule 442, which regulates ROG emissions from architectural coatings" (SMAQMD 2011). This Rule establishes numeric limits for ROGs in architectural coatings and specifies test methods for determining the level of ROGs in these products.

Source: Modeling performed by AECOM in 2011

Table 3.2-4
Summary of Modeled Maximum Daily Criteria Air Pollutant and Precursor Emissions Associated with Construction Activities

As noted above under "Analysis Methodology," unmitigated PM emissions reported in Table 3.2-3 represent the worst-case scenario, assuming that 25% of the site (85 acres) is graded in a single day (SMAQMD 2009:3-7). Based on the construction phasing map (which provides some information regarding construction activities and potential proximity to existing and new sensitive receptors), and the relatively high concentrations of daily PM_{10} and $PM_{2.5}$ dust emissions, it is possible that the ground-disturbing activities associated with site construction could result in concentrations of PM_{10} and $PM_{2.5}$ that exceed the significance thresholds.

Because mass emissions of NO_X would exceed SMAQMD's recommended threshold of significance of 85 lb/day, construction-generated emissions of criteria air pollutant precursors could contribute substantially to an existing or projected regional air quality violation. Construction emissions of criteria air pollutants (particularly localized PM_{10} dust) could expose sensitive receptors to substantial pollutant concentrations, particularly when grading and other ground disturbance activities occurs near land uses that have already been developed (and where people are already living or working) within the SPA. In addition, because the SMAQMD's significance threshold for NO_X approximately correlates with reductions from heavy-duty vehicles and reduction requirements for land use project emissions in the SIP, construction-generated emissions could also conflict with air quality planning efforts. This would be a **direct significant** impact. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure 3.2-1a: Implement Measures to Control Air Pollutant Emissions Generated by Construction Activities.

To reduce temporary and short-term construction emissions, the project applicant for any particular discretionary development application shall require their contractors to implement SMAQMD's list of Basic Construction Emission Control Practices, Enhanced Fugitive PM Dust Control Practices, and Enhanced Exhaust Control Practices (listed below) or whatever feasible mitigation measures are recommended by SMAQMD at the time individual portions of the site undergo construction. In addition to the current SMAQMD-recommended measures, construction operations shall comply with all future additional SMAQMD rules and regulations that may be applicable at the time of construction.

Basic Construction Emission Control Practices

- Water all exposed surfaces two times daily. Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads.
- Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered.

- Use wet power vacuum street sweepers to remove any visible trackout mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited.
- Limit vehicle speeds on unpaved roads to 15 miles per hour (mph).
- All roadways, driveways, sidewalks, parking lots to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, Section 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.
- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated.

Enhanced Fugitive PM Dust Control Practices – Soil Disturbance Areas

- Water exposed soil with adequate frequency for continued moist soil. However, do not overwater to the extent that sediment flows off the site.
- Suspend excavation, grading, and/or demolition activity when wind speeds exceed 20 mph.
- Install wind breaks (e.g., plant trees, solid fencing) on windward side(s) of construction areas.
- Plant vegetative ground cover (fast-germinating native grass seed) in disturbed areas as soon as possible. Water appropriately until vegetation is established.

Enhanced Fugitive PM Dust Control Practices – Unpaved Roads

- Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site.
- Treat site accesses to a distance of 100 feet from the paved road with a 6 to 12-inch layer of wood chips, mulch, or gravel to reduce generation of road dust and road dust carryout onto public roads.
- Post a publicly visible sign with the telephone number and person to contact at the construction site regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of SMAQMD and the City contact person shall also be posted to ensure compliance.

Enhanced Exhaust Control Practices

- Provide a plan, for approval by the City of Rancho Cordova Community Development Department and SMAQMD, demonstrating that the heavy-duty (50 hp or more) off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet-average 20% NO_X reduction and 45% particulate reduction compared to the most current ARB fleet average that exists at the time of construction.
- Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.

- Submit to the City of Rancho Cordova Community Development Department and SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 hp, that would be used an aggregate of 40 or more hours during any portion of the construction project. The inventory shall include the horsepower rating, engine production year, and projected hours of use for each piece of equipment. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs.

- Provide SMAQMD, at least 48 hours prior to the use of heavy-duty off-road equipment, with the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman. SMAQMD's Construction Mitigation Calculator can be used to identify an equipment fleet that achieves this reduction (SMAQMD 2010a).

- Ensure that emissions from all off-road diesel powered equipment used on the SPA do not exceed 40% opacity for more than three minutes in any one hour. Any equipment found to exceed 40% opacity (or Ringelmann 2.0) shall be repaired immediately, and the City and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment.

- Perform weekly visual surveys of all in-operation equipment and provide a monthly summary of the visual survey results to the City and SMAQMD throughout the duration of project construction. The monthly summary will not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. SMAQMD staff and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this mitigation measure shall supersede other SMAQMD or state rules or regulations.

- Comply with any regulation or new guidance applicable to construction emissions that has been adopted by SMAQMD at the time of construction. Compliance with the regulation or new guidance may completely or partially replace this mitigation if it is equal to or more effective than the mitigation contained herein, and if SMAQMD so permits. Such a determination must be approved by SMAQMD.

Mitigation Measure: Implement Portions of Mitigation Measure 3.4-1.

The project applicant for any particular discretionary development application shall implement the following submeasures from Mitigation Measure 3.4-1, which would also reduce construction-related criteria pollutant emissions:

- Improve fuel efficiency from construction equipment by using equipment with new technologies (repowered engines, electric drive trains).

- Use alternative fuels for electricity generation and welding at construction sites (such as propane or solar) or, use electrical power.

- Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.

- Use locally sourced materials for construction (goal of at least 20% based on costs for building materials, and based on volume for roadway, parking lot, sidewalk and curb materials).

- Use EPA-certified SmartWay trucks for deliveries and equipment transport. Additional information about the SmartWay Transport Partnership Program is available from ARB's Heavy-Duty Vehicle Greenhouse Gas Measure (ARB 2009c) and EPA (2009).

In addition to reducing construction-related GHGs, implementation of Mitigation Measure 3.4-1 would further reduce temporary and short-term construction-related emissions of NO_X and PM, but the reductions are not quantifiable because the reduction in the direct and indirect emissions of these pollutants due to some displacement of conventional equipment, materials, and material and worker transport-related VMT are unknown at the time of writing this DEIR/DEIS.

Implementation: The project applicants for any particular discretionary development application.

Timing: Before the approval of all grading plans by the City and throughout project construction, where applicable, for all project phases.

Enforcement: City of Rancho Cordova Community Development Department, in consultation with the Sacramento Metropolitan Air Quality Management District.

PP, BIM, CS

Predicted temporary and short-term construction-generated emissions were modeled as discussed in the Analysis Methodology section and results are presented in Table 3.2-4, above. It is possible that the ground-disturbing activities associated with site construction could result in concentrations of PM_{10} and $PM_{2.5}$ that exceed the significance thresholds.

The maximum daily level of construction-generated NO_X emissions under the Proposed Project, Biological Impact Minimization, and Conceptual Strategy Alternatives would exceed the SMAQMD-recommended threshold of 85 lb/day. Because mass emissions of NO_X would exceed SMAQMD's recommended threshold of significance of 85 lb/day, construction-generated emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation. Also, construction emissions of criteria air pollutants and precursors could expose sensitive receptors to substantial pollutant concentrations, particularly when grading and other ground disturbance activities occurs near land uses that have already been developed (and where people are already living or working) within the SPA. In addition, because the SMAQMD's significance thresholds approximately correlate with reductions from heavy-duty vehicles and reduction requirements for land use project emissions in the SIP, construction-generated emissions could also conflict with air quality planning efforts. This would be a **direct significant** impact. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3.2-1a.

Mitigation Measure 3.2-1b: Pay Off-Site Mitigation Fee to SMAQMD to Offset NO_X Emissions Generated by Construction Activities.

Because implementation of the Proposed Project, Biological Impact Minimization, Conceptual Strategy, or Increased Development Alternative would result in construction-generated NO_X emissions that exceed the SMAQMD threshold of significance, even after implementation of the SMAQMD Enhanced Exhaust Control Practices (listed in Mitigation Measure 3.2-1a), the project applicants shall pay SMAQMD an off-site mitigation fee for implementation of the Proposed Project, Biological Impact Minimization, Conceptual Strategy, or the Increased Development Alternatives for the purpose of reducing NO_X emissions to a level that is less than 85 lb/day as required by SMAQMD and described further below.

- The specific fee amounts shall be calculated when the daily construction emissions (after implementation of Mitigation Measure 3.2-1a) can be more accurately determined; that is, if the City certifies the EIR and approves the project and USACE issues a record of decision on either the Proposed Project, Biological Impact Minimization, Conceptual Strategy, or the Increased Development Alternatives. At that point, the City and the project applicants shall develop a detailed construction schedule. Calculation of fees associated with each project development phase shall be conducted by the project applicant in consultation with SMAQMD staff before the approval of grading plans by the City.

- The calculation of daily NO_X emissions shall be based on the cost rate established by SMAQMD at the time the calculation and payment are made.

- At the time of writing this EIR/EIS the current mitigation fee rate is $16,400 per ton of emissions (as of July 1, 2010) plus a 5% administrative fee (SMAQMD 2010b). The determination of the final mitigation fee shall be conducted in coordination with SMAQMD before any ground disturbance occurs for any project phase. Based on information available at the time of writing this EIR/EIS, and assuming that construction would be performed at a consistent rate over a 20-year period (and averaging of 22 work days per month for six months), it is estimated that the off-site construction mitigation fees would range from $1,136 to $35,232 per year, depending on which alternative is selected. These estimates were obtained by multiplying tons in excess of the 85 lb/day NO_x threshold for the lowest and highest emitting alternatives (i.e. 0.0005 tons/day for the BIM alternative, and 0.016 tons/day for the ID alternative) by $16,400/ton, and further multiplying by 22 workdays per month, six months per year; these numbers were then multiplied by 5%, and summed with the previous figure to obtain total annual costs. The mitigation fee is based on the mass quantity of emissions that exceed SMAQMD's daily threshold of significance of 85 lb/day, therefore, the total fees would be substantially greater if construction activity is more intense during some phases and less intense during other phases of the 19-year build out period, and in any event, based on the actual cost rate applied by SMAQMD. Since the fees will be estimated and paid before the grading permit is issued, the applicant may not pay enough for mitigation, or pay too much, and a final adjustment will be made post-construction. (This fee is used by SMAQMD to fund cost-effective projects that reduce NO_x and/or $PM_{2.5}$ in the project study area, to the extent possible, and otherwise within the Sacramento Valley Air Basin.)

Mitigation Measure: Implement Portions of Mitigation Measure 3.4-1.

The project applicants for any particular discretionary development application shall implement the following submeasures from Mitigation Measure 3.4-1, which would also reduce construction-related criteria pollutant emissions:

- Improve fuel efficiency from construction equipment by using equipment with new technologies (repowered engines, electric drive trains).

- Use alternative fuels for electricity generators and welders at construction sites such as propane or solar, or use electrical power.

- Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.

- Use locally sourced or recycled materials for construction materials (goal of at least 20% based on costs for building materials, and based on volume for roadway, parking lot, sidewalk and curb materials).

- Use EPA-certified SmartWay trucks for deliveries and equipment transport. Additional information about the SmartWay Transport Partnership Program is available from ARB's Heavy-Duty Vehicle Greenhouse Gas Measure (ARB 2009c) and EPA (2009).

In addition to reducing temporary and short-term construction-related GHGs, implementation of Mitigation Measure 3.4-1 would further reduce construction-related emissions of NO_X and PM, but the reductions are not quantifiable because the reduction in the direct and indirect emissions of these pollutants due to some displacement of conventional equipment, materials, and material and worker transport-related VMT is unknown at the time of writing this DEIR/DEIS.

Implementation: The project applicants for any particular discretionary development application.

Timing: Before the approval of all grading plans by the City and throughout project construction for all project phases.

Enforcement: The City of Rancho Cordova Community Development Department shall not grant any grading permits to the respective project applicant until the respective project applicant has paid the appropriate off-site mitigation fee to SMAQMD.

ID

Predicted temporary and short-term construction-generated emissions were modeled as discussed in the Analysis Methodology section and results are presented in Table 3.2-4, above. It is possible that the ground-disturbing activities associated with site construction could result in concentrations of PM_{10} and $PM_{2.5}$ that exceed the significance thresholds.

The maximum daily level of construction-generated NO_X emissions under the Increased Development Alternative would substantially exceed the SMAQMD-recommended threshold of 85 lb/day. Because mass emissions of NO_X would exceed SMAQMD's recommended threshold of significance of 85 lb/day, construction-generated emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation. Also, construction emissions of criteria air pollutants and precursors could expose sensitive receptors to substantial pollutant concentrations, particularly when grading and other ground disturbance activities occurs near land uses that have already been developed (and where people are already living or working) within the SPA. In addition, because the SMAQMD's significance thresholds approximately correlate with reductions from heavy-duty vehicles and reduction requirements for land use project emissions in the SIP, construction-generated emissions could also conflict with air quality planning efforts. This would be a **direct significant** impact. **No indirect** impacts would occur. ***[Greater]***

Mitigation Measure: Implement Mitigation Measures 3.2-1a, 3.2-1b, and 3.4-1a.

Implementation of Mitigation Measure 3.2-1a would reduce NO_X emissions resulting from construction of the No USACE Permit Alternative to levels that would not violate SMAQMD's threshold of significance of 85 lbs/day by implementing SMAQMD's Basic Construction Emission Control Practices and Enhanced Exhaust Control Practices (NO_X reduction of 20%); therefore, this impact as related to NO_X would be **less than significant** under the No USACE Permit Alternative. SMAQMD addresses construction-related emissions of ROG through the implementation of District Rule 442, which regulates ROG emissions from architectural coatings. With application of this rule, ROG impacts of the No USACE Permit Alternative would be **less than significant**.

With regard to NO_X emissions associated with construction of on-site elements under the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives, implementation of SMAQMD's Basic Construction Emission Control Practices and Enhanced Exhaust Control Practices, as required by Mitigation Measure 3.2-1a (NO_X reduction of 20%) would reduce the emissions of NO_X, but not to a level that is below the SMAQMD's threshold of 85 lb/day. However, SMAQMD considers that payment of an off-site mitigation fee to offset the remaining construction-generated NO_X emissions, as required by Mitigation Measure 3.2-1b, would reduce the impact to a level that SMAQMD considers less than significant. Consequently, emissions of NO_X associated with the construction of the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives would be reduced to a **less-than-significant** level following implementation of Mitigation Measures 3.2-1a and 3.2-1b. SMAQMD addresses construction-related emissions of ROG through the implementation of District Rule 442, which regulates ROG emissions from architectural coatings. With application of this rule, ROG impacts of the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives would be **less than significant**.

With regard to PM_{10} and $PM_{2.5}$ emission concentrations resulting from construction of the SPA, implementation of SMAQMD's Basic Construction Emission Control Practices, Enhanced Fugitive PM Dust Control Practices for Soil Disturbance Areas, and Enhanced Fugitive PM Dust Control Practices for Unpaved Roads, as required by Mitigation Measures 3.2-1a and portions of 3.4-1, would reduce PM_{10} and $PM_{2.5}$ concentrations generated during the construction of the on-site elements by up to 75% (SMAQMD 2009).

Mitigation Measure 3.2-1a would reduce temporary and short-term construction emissions during buildout. SMAQMD maintains a standard list of mitigation measures to address exhaust emissions and fugitive dust, as well as "enhanced" exhaust control measures that are specifically designed to address construction-related emissions. In addition, Mitigation Measure 3.2-1a requires compliance with additional feasible mitigation measures that may be recommended by SMAQMD at the time that projects in the SPA are proposed for construction. Finally, the mitigation requires compliance with applicable rules and regulations that are maintained by SMAQMD to address construction-related effects. After the analysis that was conducted to support this EIR/EIS was prepared, SMAQMD revised its recommendations for significance thresholds for PM_{10} and $PM_{2.5}$ to include concentration-based thresholds, which are the same as those provided in the CAAQS. SMAQMD assumes that if construction emissions do not exceed the PM_{10} threshold, then they would also not exceed the $PM_{2.5}$ threshold. SMAQMD further assumes that projects would not exceed the concentration based thresholds if they implement all Basic Construction Emission Control Practices and the maximum daily disturbed would not exceed 15 acres (SMAQMD 2009). Since applicant has stated that it cannot limit the area disturbed by construction for this project to 15 acres per day, the City cannot demonstrate at this time that the project would not contribute to an exceedance of the concentration based PM thresholds. Therefore, the City conservatively assumes that PM_{10} and $PM_{2.5}$ emissions associated with construction of the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives would be **significant and unavoidable**.

IMPACT 3.2-2 **Generation of Long-Term Operational (Regional) Emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$.** *Operational area- and mobile-source emissions from project implementation would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, and would result in or substantially contribute to emissions that lead to exceedances of the NAAQS or CAAQS for ozone. Operational area- and mobile-source emissions of PM_{10} and $PM_{2.5}$ could substantially contribute to emissions concentrations that lead to exceedances of the NAAQS or CAAQS for PM_{10} and $PM_{2.5}$. Therefore, project implementation could potentially violate or contribute substantially to an existing or projected air quality violation and conflict with air quality planning efforts in the SVAB.*

NP

Because the project would not be implemented under the No Project Alternative, **no direct** or **indirect** project-related impacts would occur related to long-term operational emissions of ROG, and NO_X. ***[Lesser]***

NCP

Operation of the No USACE Permit Alternative would result in long-term regional emissions of ROG, NO_X, $PM_{10,}$ and $PM_{2.5}$ associated with area sources, such as natural gas emissions, landscaping, and applications of architectural coatings, in addition to operational vehicle-exhaust emissions.

Hearth emissions were presumed to be associated with 100% natural gas combustion, per the project applicants. According to the traffic data used in this EIR/EIS, full buildout of the No USACE Permit Alternative would result in approximately 49,170 additional vehicle trips per day and a regional net increase of 364,289 VMT per day

(Fehr & Peers 2010). Operational emissions were modeled using the URBEMIS 2007 Version 9.2.4 computer program (Rimpo and Associates 2008), as recommended by SMAQMD. Model defaults were adjusted to reflect project-specific data, where available, including the sizes and types of proposed land uses. Modeled operational emissions for the No USACE Permit Alternative are presented in Table 3.2-5. Refer to Appendix L for a detailed summary of the URBEMIS modeling assumptions, inputs, and outputs.

Table 3.2-5
Summary of Modeled Long-Term Operational Emissions Under the No USACE Permit Alternative

Source	Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Operational Sources[1]				
Mobile-Source Emissions	145	141	575	109
Area-Source Emissions	263	79	2	2
Total Unmitigated Operational Emissions	408	220	577	111
SMAQMD Significance Threshold	65	65	50 $\mu g/m^3$ 24-hour standard; 20 $\mu g/m^3$ Annual Arithmetic Mean[2]	12 $\mu g/m^3$ Annual Arithmetic Mean[2]

Notes: lb/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SMAQMD = Sacramento Metropolitan Air Quality Management District; $\mu g/m^3$ = micrograms per cubic meter
See Appendix L for modeling assumptions and results.

1 Operational emissions shown represent the maximum daily emissions during the summertime or wintertime in year 2030. Totals may not add exactly due to rounding.

2 SMAQMD has not identified mass emissions thresholds for operational emissions of PM_{10} or $PM_{2.5}$. These concentration based thresholds were developed after the analysis for this EIR/EIS was completed using mass emissions data, and are reported here for disclosure purposes. SMAQMD's concentration-based thresholds for PM are based on the California ambient air quality standards (CAAQS). Operational PM emissions would only cause "hot spot" violations of the national ambient air quality standards (NAAQS) or the CAAQS under unusual circumstances that are not anticipated in the proposed project or project alternatives, i.e., in the vicinity of large quantities of unpaved road dust (PM_{10}) or diesel or other combustion sources, such as large food smokers or grills ($PM_{2.5}$). According to SMAQMD, "land use development projects do not typically have the potential to result in localized concentrations of CAPs [Criteria Air Pollutants] that exceed or contribute to an exceedance of the respective AAQS…because CAPs are predominantly generated in the form of mobile-source exhaust from vehicle trips associated with the land use development project. These vehicle trips occur throughout a paved network of roads, and, therefore, associated exhaust emissions of CAPs are not generated in a single location where high concentrations could be formed."

Source: Modeling performed by AECOM in 2010

Based on the modeling conducted, and as summarized in Table 3.2-5, operation of the No USACE Permit Alternative would result in a net increase in unmitigated long-term regional emissions of approximately 408 lb/day of ROG, 220 lb/day of NO_X, 577 lb/day of PM_{10}, and 111 lb/day of $PM_{2.5}$. Operational area- and mobile-source emissions of NO_X from implementation of the No USACE Permit Alternative would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, and would result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS for ozone and secondary formation of $PM_{2.5}$.

Operational PM emissions would only cause "hot spot" violations of the NAAQS or the CAAQS under unusual circumstances, i.e., in the vicinity of large quantities of unpaved road dust (PM_{10}) or diesel or other combustion sources such as large food smokers or grills ($PM_{2.5}$). However, direct, operational PM emissions associated with the project could substantially contribute to increases in regional PM, especially $PM_{2.5}$, which is not as easily removed from the atmosphere as PM_{10}.

Although the project is not specifically included in the *Ozone Attainment and Reasonable Further Progress Plan* (SMAQMD 2008a), the plan uses emissions based on the Metropolitan Transportation Plan's (MTP's) land use assumptions, which allocated medium-density mixed residential to the southeast arm of Rancho Cordova. Since the SPA is planned for buildout of similar land uses, some similar emissions estimates were included in the plan.

Because development of the SPA is included in the City's General Plan, operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land use development on the site are already accounted for to some degree in the applicable air quality plans. However, implementation of the No USACE Permit Alternative could still potentially conflict with air quality planning efforts in the SVAB. As a result, this long-term **direct** impact is considered **significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure 3.2-2: Implement All Measures Prescribed by the Air Quality Mitigation Plan to Reduce Operational Air Pollutant Emissions.

To reduce operational emissions under the No USACE Permit Alternative, the project applicants for any particular discretionary development application shall implement all measures prescribed in the SMAQMD-approved *SunCreek Specific Plan 15 Point Air Quality Mitigation Plan* (AQMP) (AECOM 2010), a copy of which is included in Appendix M. The AQMP is intended to improve mobility, reduce VMT, and improve air quality.

Implementation: The project applicants for any particular discretionary development application.

Timing: Before issuance of subdivision maps or improvement plans.

Enforcement: City of Rancho Cordova Community Development Department in consultation with the Sacramento Metropolitan Air Quality Management District.

PP

According to the traffic data used for this EIR/EIS, full buildout of the Proposed Project Alternative would result in approximately 96,303 additional vehicle trips per day and a regional net increase of 622,868 VMT per day (Fehr & Peers 2010).

Modeled operational emissions for the Proposed Project Alternative are presented in Table 3.2-6. Refer to Appendix L for a detailed summary of the URBEMIS modeling assumptions, inputs, and outputs.

Operational PM emissions would only cause "hot spot" violations of the NAAQS or the CAAQS under unusual circumstances that are not anticipated in the Proposed Project or and of the project alternatives, i.e., in the vicinity of large quantities of unpaved road dust (PM^{10}) or diesel or other combustion sources, such as large food smokers or grills ($PM^{2.5}$). The City does not anticipate these unusual circumstances to occur in the SPA. According to SMAQMD, "land use development projects do not typically have the potential to result in localized concentrations of CAPs [Criteria Air Pollutants] that exceed or contribute to an exceedance of the respective AAQS…because CAPs are predominantly generated in the form of mobile-source exhaust from vehicle trips associated with the land use development project. These vehicle trips occur throughout a paved network of roads, and, therefore, associated exhaust emissions of CAPs are not generated in a single location where high concentrations could be formed." Concentration-based PM thresholds would not be exceeded.

Based on the modeling conducted, and as summarized in Table 3.2-6, operation of the Proposed Project Alternative would result in a net increase in unmitigated long-term regional emissions of approximately 523 lb/day of ROG, 335 lb/day of NO_X, 961 lb/day of PM_{10}, and 185 lb/day of $PM_{2.5}$. Operational area- and mobile-source emissions of NO_X from implementation of the Proposed Project Alternative would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, which could result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS. Because development of the SPA is included in the City's General Plan, operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land use development on the site are already accounted for to some degree in the applicable air quality plans. However, implementation of the Proposed Project Alternative could still potentially conflict with air quality planning efforts in the SVAB.

Table 3.2-6
Summary of Modeled Long-Term Operational Emissions Under the Proposed Project Alternative

Source	Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Operational Sources[1]				
Mobile-Source Emissions	256	239	959	183
Area-Source Emissions	267	96	2	2
Total Unmitigated Operational Emissions	523	335	961	185
SMAQMD Significance Threshold	65	65	50 μg/m³ 24-hour standard; 20 μg/m³ Annual Arithmetic Mean[2]	12 μg/m³ Annual Arithmetic Mean[2]

Notes: lb/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SMAQMD = Sacramento Metropolitan Air Quality Management District; μg/m³ = micrograms per cubic meter

See Appendix L for modeling assumptions and results.

1 Operational emissions shown represent the maximum daily emissions during the summertime or wintertime in year 2030. Totals may not add exactly due to rounding.

2 SMAQMD has not identified mass emissions thresholds for operational emissions of PM_{10} or $PM_{2.5}$. Emission levels are shown for informational purposes only. See footnote 2 in Table 3.2-5 for additional detail.

Source: Modeling performed by AECOM in 2010

As a result, this long-term **direct** impact is considered **significant**. **No indirect** impacts would occur.

Mitigation Measure: Implement Mitigation Measure 3.2-2.

BIM

According to the traffic data used for this EIR/EIS, full buildout of the Biological Impact Minimization Alternative would result in approximately 45,954 additional vehicle trips per day and a regional net increase of 338,131 VMT per day (Fehr & Peers 2010). Modeled operational emissions for the Conceptual Strategy Alternative are presented in Table 3.2-7. Refer to Appendix L for a detailed summary of the URBEMIS modeling assumptions, inputs, and outputs.

Based on the modeling conducted, and as summarized in Table 3.2-7, operation of the Biological Impact Minimization Alternative would result in a net increase in unmitigated long-term regional emissions of approximately 386 lb/day of ROG, 217 lb/day of NO_X, 574 lb/day of PM_{10}, and 111 lb/day of $PM_{2.5}$. Operational area- and mobile-source emissions of NO_X from implementation of the Biological Impact Minimization Alternative would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, which could result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS. Because development of the SPA is included in the City's General Plan, operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land use development on the site are already accounted for to some degree in the applicable air quality plans. However, implementation of the Biological Impact Minimization Alternative could still potentially conflict with air quality planning efforts in the SVAB. As a result, this long-term **direct** impact is considered **significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.2-2.

Table 3.2-7 Summary of Modeled Long-Term Operational Emissions Under the Biological Impact Minimization Alternative				
Source	Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Operational Sources[1]				
Mobile-Source Emissions	141	139	572	109
Area-Source Emissions	245	78	2	2
Total Unmitigated Operational Emissions	386	217	574	111
SMAQMD Significance Threshold	65	65	50 $\mu g/m^3$ 24-hour standard; 20 $\mu g/m^3$ Annual Arithmetic Mean[2]	12 $\mu g/m^3$ Annual Arithmetic Mean[2]

Notes: lb/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SMAQMD = Sacramento Metropolitan Air Quality Management District; $\mu g/m^3$ = micrograms per cubic meter

See Appendix L for modeling assumptions and results.

[1] Operational emissions shown represent the maximum daily emissions during the summertime or wintertime in year 2030. Totals may not add exactly due to rounding.

[2] SMAQMD has not identified mass emissions thresholds for operational emissions of PM_{10} or $PM_{2.5}$. Emission levels are shown for informational purposes only. See footnote 2 in Table 3.2-5 for additional detail

Source: Modeling performed by AECOM in 2010

CS

According to the traffic data used for this EIR/EIS, full buildout of the Conceptual Strategy Alternative would result in approximately 61,210 additional vehicle trips per day and a regional net increase of 371,489 VMT per day (Fehr & Peers 2010). Modeled operational emissions for the Conceptual Strategy Alternative are presented in Table 3.2-8. Refer to Appendix L for a detailed summary of the URBEMIS modeling assumptions, inputs, and outputs.

Table 3.2-8 Summary of Modeled Long-Term Operational Emissions Under the Conceptual Strategy Alternative				
Source	Emissions (lb/day) [1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Operational Sources [1]				
Mobile-Source Emissions	179	172	701	134
Area-Source Emissions	261	85	2	2
Total Unmitigated Operational Emissions	440	257	703	136
SMAQMD Significance Threshold	65	65	50 $\mu g/m^3$ 24-hour standard; 20 $\mu g/m^3$ Annual Arithmetic Mean[2]	12 $\mu g/m^3$ Annual Arithmetic Mean[2]

Notes: lb/day = pounds per day; $\mu g/m^3$ = micrograms per cubic meter; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SMAQMD = Sacramento Metropolitan Air Quality Management District

See Appendix L for modeling assumptions and results.

[1] Operational emissions shown represent the maximum daily emissions during the summertime or wintertime in year 2030. Totals may not add exactly due to rounding.

[2] SMAQMD has not identified mass emissions thresholds for operational emissions of PM_{10} or $PM_{2.5}$. Emission levels are shown for informational purposes only. See footnote 2 in Table 3.2-5 for additional detail.

Source: Modeling performed by AECOM in 2010

Based on the modeling conducted, and as summarized in Table 3.2-8, operation of the Conceptual Strategy Alternative would result in a net increase in unmitigated long-term regional emissions of approximately 440 lb/day of ROG, 257 lb/day of NO_X, 703 lb/day of PM_{10}, and 136 lb/day of $PM_{2.5}$. Operational area- and mobile-source emissions of NO_X from implementation of the Conceptual Strategy Alternative would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, which could result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS.

Because development of the SPA is included in the City's General Plan, operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land use development on the site are already accounted for to some degree in the applicable air quality plans. However, implementation of the Conceptual Strategy Alternative could still potentially conflict with air quality planning efforts in the SVAB. As a result, this long-term **direct** impact is considered **significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.2-2.

ID

According to the traffic data used for this EIR/EIS, full buildout of the Increased Development Alternative would result in approximately 72,878 additional vehicle trips per day and a regional net increase of 444,627 VMT per day (Fehr & Peers 2010). Modeled operational emissions for the Increased Development Alternative are presented in Table 3.2-9. Refer to Appendix L for a detailed summary of the URBEMIS modeling assumptions, inputs, and outputs.

Based on the modeling conducted, and as summarized in Table 3.2-9, operation of the Increased Development Alternative would result in a net increase in unmitigated long-term regional emissions of approximately 386 lb/day of ROG, 217 lb/day of NO_X, 574 lb/day of PM_{10}, and 111 lb/day of $PM_{2.5}$. Operational area- and mobile-source emissions of NO_X from implementation of the Increased Development Alternative would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, and would result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS.

Table 3.2-9
Summary of Modeled Long-Term Operational Emissions Under the Increased Development Alternative

Source	Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Operational Sources[1]				
Mobile-Source Emissions	141	139	572	109
Area-Source Emissions	245	78	2	2
Total Unmitigated Operational Emissions	386	217	574	111
SMAQMD Significance Threshold	65	65	50 μg/m³ 24-hour standard; 20 μg/m³ Annual Arithmetic Mean[2]	12 μg/m³ Annual Arithmetic Mean[2]

Notes: lb/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SMAQMD = Sacramento Metropolitan Air Quality Management District; μg/m³ = micrograms per cubic meter
See Appendix L for modeling assumptions and results.
1 Operational emissions shown represent the maximum daily emissions during the summertime or wintertime in year 2030. Totals may not add exactly due to rounding.
2 SMAQMD has not identified mass emissions thresholds for operational emissions of PM_{10} or $PM_{2.5}$. Emission levels are shown for informational purposes only. See footnote 2 in Table 3.2-5 for additional detail.
Source: Modeling performed by AECOM in 2010

Because development of the SPA is included in the City's General Plan, operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land use development on the site are already accounted for to some degree in the applicable air quality plans. However, implementation of the Increased Development Alternative could still potentially conflict with air quality planning efforts in the SVAB. As a result, this long-term **direct** impact is considered **significant**. **No indirect** impacts would occur. ***[Lesser for ROG and NO_x, Greater for PM_{10} and $PM_{2.5}$]***

Mitigation Measure: Implement Mitigation Measure 3.2-2.

Implementation of the SMAQMD-approved SunCreek Specific Plan 15 Point Air Quality Mitigation Plan would substantially reduce PM_{10}, and $PM_{2.5}$ emissions. For this project, PM emissions are predominantly attributable to mobile sources and will be distributed throughout a large area via trips generated by, and attracted to, the SPA. Operational PM emissions would only cause "hot spot" violations of the NAAQS or the CAAQS under unusual circumstances, i.e., in the vicinity of large quantities of unpaved road dust (PM_{10}) or diesel or other combustion sources, such as large food smokers or grills ($PM_{2.5}$). The City does not anticipate these unusual circumstances to occur in the SPA. According to SMAQMD, "land use development projects do not typically have the potential to result in localized concentrations of CAPs [Criteria Air Pollutants] that exceed or contribute to an exceedance of the respective AAQS…because CAPs are predominantly generated in the form of mobile-source exhaust from vehicle trips associated with the land use development project. These vehicle trips occur throughout a paved network of roads, and, therefore, associated exhaust emissions of CAPs are not generated in a single location where high concentrations could be formed." (SMAQMD 2009) Impacts related to PM_{10}, and $PM_{2.5}$ concentrations for the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives are considered **less than significant with mitigation**.

Implementation of all air pollutant reduction measures contained in the SMAQMD-approved AQMP, as required by Mitigation Measure 3.2-2, would reduce ROG and NO_X emissions associated with operation of the project, but not to a less-than-significant level. However, for reasons described in more detail below, the exact reduction achieved by implementation of Mitigation Measure 3.2-2 cannot be determined for the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives.

While the AQMP was developed to achieve a 15% reduction in operational NO_X emissions from baseline levels, based on the traffic study, the baseline levels are not represented by the URBEMIS modeling output summarized in Tables 3.2-5 through 3.2-9 (above). For the purposes of developing an AQMP pursuant to SMAQMD's *Guidance for Land Use Emission Reductions* (SMAQMD 2007), a baseline emissions level is presumed that is based on standard default trip generation rates established by the Institution of Transportation Engineers (ITE). The traffic modeling performed to support the modeling of operational emissions summarized in Tables 3.2-5 through 3.2-9 of this section, did not use standard ITE trip generation rates. Instead, the traffic analysis was based on a modified version of the 2008 SACMET regional travel demand forecasting model (Fehr & Peers 2010).

By incorporating more parameters that are unique to the region and the SPA, the model estimates more precise (and lower) estimates of VMT than using standard default ITE trip generation rates, which in turn results in more precise (and lower) estimates of operational air pollutant emissions. In other words, the traffic modeling already accounts for some of the unique attributes of the alternative land use plans (such as the proximity of residential and commercial land uses to activity centers and to transit service), for which an emissions reduction is also included in the AQMP. Therefore, one would overestimate the reduction achieved by the AQMP by reducing the levels of operational NO_X emissions reported in Tables 3.2-5 through 3.2-9 by 15%. The actual emission reduction benefit of the AQMP would be some amount less than 15%. Nonetheless, even if operational emissions of ROG and NO_X were 15% lower than the levels reported in Tables 3.2-5 through 3.2-9, they would still exceed SMAQMD's significance threshold of 65 lb/day. Implementation of the AQMP would not reduce long-term operational impacts of the project to a less-than-significant level. As a result, this impact would be **significant and unavoidable**.

IMPACT 3.2-3 **Creation of Carbon Monoxide (CO) "Hot Spots".** *Project implementation would not result in the creation of CO Hot Spots from mobile sources.*

NP

Because the project would not be implemented under the No Project Alternative, **no direct** or **indirect** project-related impacts would occur related to creation of CO hot spots from mobile sources. ***[Lesser]***

NCP, PP, BIM, CS, ID

Under all five action alternatives, the localized impacts associated with CO emissions from on- and off-site operational mobile sources would be similar and are each discussed below.

SMAQMD has developed a preliminary screening methodology to provide a conservative indication of whether project-generated vehicle trips would result in CO emissions that contribute to an exceedance of the NAAQS or CAAQS. SMAQMD's recommended screening criteria are divided into two tiers, as described below.

First Tier

The project would result in a less-than-significant impact to air quality for local CO if:

- traffic generated by the project would not result in deterioration of intersection level of service (LOS) to LOS E or F; or
- the project would not contribute additional traffic to an intersection that already operates at LOS of E or F.

If the first tier of screening criteria is not met then the second tier of screening criteria shall be examined.

Second Tier

If all of the following criteria are met, the project would result in a less-than-significant impact to air quality for local CO:

- the project would not result in an affected intersection experiencing more than 31,600 vehicles per hour;
- the project would not contribute traffic to a tunnel, parking garage, bridge underpass, urban street canyon, or below-grade roadway; or other locations where horizontal or vertical mixing of air would be substantially limited; and
- the mix of vehicle types at the intersection is not anticipated to be substantially different from the County average (as identified by the EMFAC or URBEMIS models).

Because several intersections in the project vicinity would deteriorate to LOS E due to project implementation, and several intersections currently operate at LOS F, the project does not meet the first tier screening criteria and therefore the second tier criteria must be examined.

The intersection traffic volumes associated with buildout of all five action alternatives do not approach the second tier screening value of 31,600 vehicles per hour (the highest intersection traffic is 7,860 vehicles per hour on Sunrise Boulevard from Gold Country Boulevard to Coloma Road; see Section 3.15, "Traffic and Transportation" and Appendix L for details). Additionally, the project would not contribute traffic to a location with limited horizontal or vertical mixing. Lastly, the mix of vehicle types added to any intersection under any of the five action alternatives would not be substantially different from the County average; in particular, none of the five action alternatives is anticipated to add substantial numbers of medium or heavy gas-powered vehicles with higher CO emissions than would be expected from an average fleet mix.

In conclusion, none of the five action alternatives violate any of SMAQMD's second tier screening criteria for CO hot spot generation. Therefore, mobile source CO emissions associated with implementation of the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternative would not cause localized exceedances of the NAAQS or CAAQS, and this long-term **direct** impact is considered **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.2-4 **Exposure of Sensitive Receptors to Temporary and Short-, and Long-Term Emissions of Toxic Air Contaminants.** *Project implementation would result in exposure of receptors to temporary and short-, and long-term emissions of TACs from on-site stationary and mobile sources and from off-site mobile sources.*

NP

Because the project would not be implemented under the No Project Alternative, **no direct** or **indirect** project-related impacts would occur related to exposures of sensitive receptors to short- and long-term emissions of TACs. ***[Lesser]***

NCP, PP, BIM, CS, ID

Under all five action alternatives, the TAC impacts associated with exposure of sensitive receptors to temporary and short-term emissions from construction equipment, long-term stationary-source emissions, emissions from on-site operational mobile sources, and land use compatibility with neighboring roads would be similar and are each discussed below.

Temporary and Short-Term Emissions from Construction Equipment

Construction of the project would result in temporary and short-term emissions of diesel exhaust from on-site heavy-duty equipment. Diesel particulate matter was identified as a TAC by ARB in 1998. Construction of the project would result in the generation of DPM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities. According to ARB, the potential cancer risk from the inhalation of DPM, which is discussed below, outweighs the potential noncancer health impacts (ARB 2003).

The dose to which the receptors are exposed (a function of concentration and duration of the exposure period) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). According to OEHHA, health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project.

The use of mobilized equipment in each area of the SPA would be temporary. In addition, some new residents would occupy the site concurrently with on-site construction activities. Thus, DPM from construction activities could also expose on-site residents and schools to levels that exceed applicable standards as some phases of the development plan are built out while construction of other phases continues. Particularly, some residents may be exposed to DPM generated by construction activity in all directions (at varying times). Additionally, adjacent, off-site sensitive receptors could be exposed to construction activities occurring within the SPA. Even with the dispersive properties of DPM (Zhu et al. 2002), construction activities could expose sensitive receptors to levels of health risk that exceed applicable standards. Therefore, this **direct** impact is considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.2-1a and 3.4-1a.

Emissions from On-Site Operational Stationary-Sources

No stationary sources of TAC emissions are located on or immediately adjacent to the SPA.

Long-term operation of on-site commercial uses would likely include the installation of stationary sources of TACs, such as dry cleaning establishments, gasoline-dispensing facilities, diesel-fueled backup generators, and/or restaurants using charbroilers. These and other types of stationary sources may also be developed at off-site locations near the SPA in future years. All stationary sources that may emit TACs would be subject to SMAQMD permitting regulations and T-BACT requirements. Pursuant to SMAQMD Regulation 2 (Permit Requirements) and Rule 904 (Air Toxic Control Measures) SMAQMD would analyze such sources (e.g., in a health risk assessment) based on their potential to emit TACs.

If it is determined that the sources would emit TACs in excess of SMAQMD's applicable threshold of significance, T-BACT would be implemented to reduce emissions. If the implementation of T-BACT would not reduce the risk below the applicable threshold, then SMAQMD would deny the required permit.

As a result, operation of any stationary sources would not result in the exposure of sensitive receptors to TACs at levels exceeding SMAQMD's significance thresholds. Therefore, this **direct** impact is considered **less than significant. No indirect** impact would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

Emissions from On-Site Operational Mobile Sources

Project development would include residences, schools, and parks. Because of the sensitivity of such uses, assessment of compatibility of surrounding land uses with respect to sources of TAC emissions is required.

On-site mobile sources of TACs would primarily be associated with the operation of school buses transporting students to and from the proposed schools, as well as diesel-powered delivery trucks associated with proposed on-site commercial activities.

Emissions from school buses can vary, depending on various factors, including bus type, age, maintenance, and amount of time spent idling. Health impacts from exhaust exposure include eye and respiratory irritation, enhanced respiratory allergic reactions, asthma exacerbation, increased cancer risk, and immune system degradation. Generally, children are more vulnerable to air pollutants because of higher inhalation rates, narrower airways, and less mature immune systems.

In response to the above issue, the ARB adopted an ATCM as part of the Particulate Matter Risk Reduction Plan to specifically deal with diesel emissions from school buses. This ATCM became effective July 16, 2003. The school bus idling ATCM includes the following requirements:

(a) The driver of a school bus or vehicle, transit bus, or heavy-duty vehicle (other than a bus) shall manually turn off the bus or vehicle upon arriving at a school and restart no more than 30 seconds before departing. A driver of a school bus or vehicle shall be subject to the same requirement when operating within 100 feet of a school and shall be prohibited from idling more than 5 minutes at each stop beyond schools, such as parking or maintenance facilities, school bus stops, or school activity destinations. A driver of a transit bus or heavy-duty vehicle (other than a bus) shall be prohibited from idling more than 5 minutes at each stop within 100 feet of a school. Idling necessary for health, safety, or operational concerns shall be exempt from these restrictions.

(b) The motor carrier of the affected bus or vehicle shall ensure that drivers are informed of the idling requirements, track complaints and enforcement actions, and keep track of driver education and tracking activities.

According to ARB, implementation of the above requirements would eliminate unnecessary idling for school buses and other heavy-duty vehicles, protecting children from unhealthful exhaust emissions and thus reducing localized exposure to TACs and other harmful air pollution emissions at and near schools.

On-site operational mobile sources of TAC emissions would also be associated with the operation of diesel-powered delivery trucks at the loading docks and delivery areas of commercial land uses. Some sensitive land uses within the SPA would be located within 100 feet of commercial uses (e.g., local town center, commercial mixed use, and public/quasi-public land uses). Operational activities that require the use of diesel-fueled vehicles for extended periods, such as commercial trucking facilities, delivery/distribution areas, or loading docks, could expose nearby sensitive receptors to DPM emissions. The DPM emissions generated by these uses would be produced primarily at discrete locations on a regular basis. Idling trucks at these locations, including trailer refrigeration units (TRUs), could result in the exposure of nearby residents to increased DPM levels on a reoccurring basis.

As referenced above, the ARB's *Handbook* recommends avoiding the siting of new commercial trucking facilities that accommodate more than 100 trucks per day, or 40 trucks equipped with TRUs, within 1,000 feet of sensitive receptors (e.g., residences or schools) (ARB 2005). The number of trucks that would visit the facilities on any given day is not known at this time; however, based on the SunCreek Specific Plan (Appendix C), the types of commercial uses proposed for the SPA would not involve large-scale trucking operations. For the purposes of the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives, it is not anticipated that the combination of commercial land uses proposed in the SPA would exceed these screening limits.

In addition to the school bus idling ATCM, ARB also adopted an idling restriction ATCM for large commercial diesel-powered vehicles, which became effective February 1, 2005. In accordance with this measure, affected vehicles are required to limit idling to no longer than 5 minutes under most circumstances. ARB is also evaluating additional ATCMs intended to further reduce TACs associated with commercial operations, including a similar requirement to limit idling of smaller diesel-powered commercial vehicles.

Nonetheless, given that proposed on-site commercial and/or retail land uses for the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives have not yet been identified and could potentially involve substantial volumes of truck activity occurring in close proximity to nearby sensitive receptors, exposure of nearby on-site receptors to mobile-source TACs associated with commercial activities is considered a **direct** and **potentially significant** impact. **No indirect** impact would occur. ***[Similar]***

Mitigation Measure 3.2-4: Implement Measures to Reduce Exposure of Sensitive Receptors to Long-Term Operational Emissions of Toxic Air Contaminants.

- For every proposed commercial or retail land use within 1,000 feet of a sensitive land use that has the potential to emit TACs or host TAC-generating activity (e.g., loading docks, delivery areas that would accommodate more than 100 trucks per day, more than 40 trucks with operating TRUs per day, or where TRU unit operations exceed 300 hours per week), a HRA shall be performed by each individual project applicant to determine whether existing or proposed on-site sensitive receptors will be exposed to TAC emissions that exceed an incremental increase of 10 in 1 million for cancer risk and/or a noncarcinogenic Hazard Index (HI) of 1.0. If the results of the HRA indicate that the cancer risk or HI exceeds the above-mentioned limits, the individual project applicant shall employ measures to reduce exposures to levels below the limits, which may include one or more of the following: Where necessary to reduce exposure of sensitive receptors to an incremental increase of 10 in 1 million for the cancer risk and/or a noncarcinogenic HI of 1.0, proposed commercial and industrial land uses that would host diesel trucks shall incorporate idle reduction strategies that reduce the main propulsion engine idling time through alternative technologies such as, IdleAire, electrification of truck parking, and alternative energy sources for TRUs, to allow diesel engines to be completely turned off.

- Signs shall be posted in at all loading docks and truck loading areas which indicate that diesel-powered delivery trucks must be shut off when not in use for longer than 5 minutes on the premises in order to reduce idling emissions. This measure is consistent with the ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling, which was approved by the California Office of Administrative Law in January 2005.

Implementation: The project applicants for any particular discretionary development application.

Timing: Before the approval of all grading plans by the City and throughout project construction, where applicable, for all project phases.

Enforcement: City of Rancho Cordova Community Development Department in consultation with the Sacramento Metropolitan Air Quality Management District.

Emissions from Off-Site Operational Mobile-Sources

As described previously, SMAQMD has developed a Protocol that provides a methodology for the assessment of potential cancer risk from DPM attributable to siting sensitive land uses adjacent to freeways and major roadways.

The first step in screening a project using the protocol is to determine if the nearest sensitive receptor affected by the project is at least 500 feet from the nearest high traffic volume roadway (defined as a freeway, urban roadway with greater than 100,000 vehicles/day, or rural roadway with 50,000 vehicles/day). If the project is outside of the 500 foot distance, then the project meets the ARB guidance distance and no further roadway-related air quality evaluations are recommended under the protocol.

Because none of the roadways within 500 feet of the SPA (Sunrise Boulevard, Kiefer Boulevard, Rancho Cordova Parkway, North Campus Drive, Chrysanthy Road, or Grant Line Road) approach average daily volumes of 100,000 vehicles per day under any of the five Action Alternatives (approximately 2,000—4,000 vehicles are expected during peak hour at the intersections mentioned above, see Section 3.15, "Traffic and Transportation" and Appendix L for details), the project screens out using SMAQMD's Protocol. Therefore, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

Implementation of Mitigation Measures 3.2-1a and 3.4-1would reduce health-related risks associated with the use of off-road diesel powered equipment during construction activity under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives by reducing DPM emissions. Therefore, the exposure of receptors to construction-generated TAC emissions is considered to be **less than significant**.

Implementation of Mitigation Measure 3.2-4 would reduce health-related risks associated with stationary on-site operational sources of TACs under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level because stationary sources of TACs must be permitted by SMAQMD and permit conditions are designed to avoid significant effects.

Implementation of Mitigation Measure 3.2-4 would reduce exposure of receptors to on-site mobile sources of TAC emissions within the SPA to a **less-than-significant** level by providing specific guidance for future analysis and mitigation measures based on types and locations of future commercial facilities and their proximity to sensitive receptors that is not known at the time of writing this DEIR/DEIS. In the future, as improvement plans and tentative subdivision map-level plans are prepared, depending on the types and locations of future commercial facilities and their proximity to sensitive receptors, the mitigation provided will direct actions to reduce impacts. The level of impact will also decrease since emissions of TACs are expected to decrease in future years and cleaner diesel technologies are implemented.

IMPACT 3.2-5	**Exposure of Sensitive Receptors to Temporary and Short-Term and Long-Term Odorous Emissions.** *Temporary and short-term construction and long-term operation of the project could result in the frequent exposure of sensitive receptors to substantial objectionable odor emissions.*

NP

Because the project would not be implemented under the No Project Alternative, **no direct** or **indirect** project-related impacts would occur related to exposures of sensitive receptors to short- and long-term emissions of TACs. ***[Lesser]***

NCP, PP, BIM, CS, ID

Possible Temporary and Short-Term On- and Off-Site Emissions from Construction Equipment

Project construction activities associated with the development of on-site land uses could result in odorous emissions from diesel exhaust generated by construction equipment. During some periods of the 20-year buildout of the project, intense levels of construction activity could potentially occur in close proximity to existing or future on-site sensitive receptors. Construction activity could potentially occur near on-site sensitive receptors for an extended period of time. In addition, existing or future residents in the existing or future residential neighborhoods located outside of, but adjacent to the SPA in Rancho Cordova, could be exposed to odorous diesel exhaust emissions generated by on-site construction activity. Because this activity could result in objectionable odors that could affect nearby sensitive receptors, this would be considered a **direct, significant** impact. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.2-1a and 3.4-1a.

Long-Term On-Site Operational Emissions

No common sources of nuisance odors, such as wastewater treatment facilities, waste disposal facilities, or agricultural operations, are proposed as part of the project. While there would be approximately 3 to 4 wastewater pumping stations located on the SPA, these facilities would have controls that would prevent the release of objectionable odors. In addition, the detention basins that would be located throughout the site would not typically hold storm water long enough for odor-generating anaerobic activity to occur. (See Chapter 2, “Alternatives,” Appendix D, and Appendix I.) With regular maintenance and proper design, residential land uses are typically not considered a major source of odors.

Sensitive receptors could be exposed to on-site DPM, gasoline, and dry cleaning odors. Additionally, on-site sewer lift stations could intermittently emit diesel odors. Lastly, development of on-site commercial land uses could include retail or other uses that may include sources of odorous emissions (e.g., fast-food restaurants) that would be perceived as offensive to some individuals. The operation of such sources could expose on-site receptors to objectionable odorous emissions. As a result, this **direct** impact from long-term operational on-site odors would be considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3.2-4.

Mitigation Measure 3.2-5: Implement Measures to Control Exposure of Sensitive Receptors to On-Site Odorous Emissions.

The project applicants for any particular discretionary development application shall implement the following measures:

- For new project-generated odor-producing sources, sensitive receptors within the SPA shall be sited as far away as feasible from the new sources and the following shall also be implemented:
    - The odor-producing potential of land uses shall be considered when the exact type of facility that would occupy areas zoned for commercial or mixed land uses is determined. Facilities that have the potential to emit objectionable odors shall be located as far away as feasible from existing and proposed sensitive receptors.
    - Before the approval of building permits, odor control devices shall be identified to reduce the exposure of receptors to objectionable odors if a potential odor-producing source is to occupy an area zoned for commercial or mixed land uses. The identified odor control devices shall be installed before the issuance of certificates of occupancy for the potentially odor-producing use. The odor-producing potential of a source and control devices shall be determined in coordination with SMAQMD and based on the number of complaints associated with existing sources of the same nature.
    - Truck loading docks and delivery areas shall be located as far away as feasible from existing and proposed sensitive receptors.
    - Signs shall be posted at all loading docks and truck loading areas which indicate that diesel-powered delivery trucks must be shut off when not in use for longer than 5 minutes on the premises in order to reduce idling emissions. This measure is consistent with the ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling, which was approved by California's Office of Administrative Law in January 2005. (This measure is also required by Mitigation Measure 3.2-3b to limit TAC emissions.)
    - Proposed commercial land uses that have the potential to host diesel trucks shall incorporate idle reduction strategies that reduce the main propulsion engine idling time through alternative technologies such as, IdleAire, electrification of truck parking, and alternative energy sources for TRUs, to allow diesel engines to be completely turned off. (This measure is also required by Mitigation Measure 3.2-3b to limit TAC emissions.)

Implementation: The project applicants for any particular discretionary development application.

Timing: Before the approval of building permits by the City and throughout project construction, where applicable, for all project phases.

Enforcement: City of Rancho Cordova Community Development Department, in consultation with the Sacramento Metropolitan Air Quality Management District.

Implementation of Mitigation Measures 3.2-1a, 3.2-4, and 3.4-1 would reduce temporary and short-term emissions as well as operational mobile-source emissions of DPM, which in turn would reduce odors associated with the use of off-road diesel powered equipment during construction-related activities under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level.

Implementation of Mitigation Measure 3.2-5 would reduce odors associated with new on-site operational odor sources under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level because odor-control devise would be installed, land uses would be sited to avoid placing sensitive receptors in close proximity to on-site odor emissions, and diesel trucks at commercial loading docks will be required to implement idle reduction controls.

IMPACT 3.2-6 **Need for Conformity Analysis and Conflicts with Federal Attainment Planning.** *Construction of the action alternatives would not conflict with attainment and implementation planning efforts related to Federal air quality standards for criteria air pollutants.*

NP, NCP, PP, BIM, CS, ID

In order to approve or permit projects, Federal agencies must demonstrate that the approved action does not interfere with applicable attainment planning for criteria air pollutants (42 U.S.C. Section 7506[c]). This assessment is known as conformity analysis or general conformity. SMAQMD adopted Federal conformity requirements as a part of the Air District's Rule 104. Conformity means:

> "(A) conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and
>
> (B) that such activities will not
>
> > (i) cause or contribute to any new violation of any standard in any area;
> >
> > (ii) increase the frequency or severity of any existing violation of any standard in any area; or
> >
> > (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.
>
> The determination of conformity shall be based on the most recent estimates of emissions, and such estimates shall be determined from the most recent population, employment, travel and congestion estimates as determined by the metropolitan planning organization or other agency authorized to make such estimates (42 U.S.C. Section 7506[c][1]).

In order to determine whether conformity analysis is required, emissions of the action being considered are compared to "de minimis" thresholds that are established based on the severity of the nonattainment classification. The emissions considered are limited to those caused by the Federal action and over which the Federal agency will have control (40 CFR Section 51.852). For the SunCreek Specific Plan, this is limited to construction-related emissions. A conformity determination is required if emissions exceed de-minimis levels or account for 10% or more of a nonattainment or maintenance area's emissions inventory for the subject pollutant or precursor. The following de minimis levels apply to the Proposed Project and the other four action alternatives: NO_x—25 tons per year; VOC/ROG—25 tons per year; and PM_{10}—100 tons per year (40 CFR Section 93.153). A single year of construction activity was modeled (see Appendix L). As shown in Table 3.2-10, the projected annual emissions for the Proposed Project and the other four action alternatives would not exceed de-minimis levels. This would be a **less-than-significant**, **direct** impact. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

Table 3.2-10 Maximum Annual Construction-Related Emissions (Tons per Year)			
	VOC/ROG	**NO_X**	**PM_{10}**
De minimis thresholds	**25**	**25**	**100**
Action Alternative			
No USACE Permit Alternative	8.39	5.66	19.03
Proposed Project Alternative	10.66	8.63	28.69
Biological Impact Minimization Alternative	8.61	6..44	23.38
Conceptual Strategy Alternative	9.45	6.58	26.24
Increased Development Alternative	14.66	8.89	32.62

Notes: VOC = volatile organic compounds, ROG = reactive organic gases, NO_X = oxides of nitrogen, PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less.
Source: Modeled by AECOM in 2012

3.2.4 RESIDUAL SIGNIFICANT IMPACTS

Implementation of Mitigation Measure 3.2-1a would reduce temporary and short-term construction-related emissions of criteria air pollutants (PM_{10}), but not to less-than-significant levels, because emissions and exposure levels could potentially exceed applicable thresholds, and could substantially contribute to localized concentrations that exceed the NAAQS and CAAQS. Therefore, residual significant impacts may occur.

Implementation of Mitigation Measure 3.2-2 would reduce long-term operation-related (regional) emissions of criteria air pollutants and precursors (ROG, NO_X), but not to less-than-significant levels, because emissions and exposure levels could potentially exceed applicable thresholds and may conflict with air quality planning efforts. Therefore, residual significant impacts may occur. Long-term PM_{10} and $PM_{2.5}$ emissions would, however, be less than significant after mitigation.

All other air quality impacts, that is, construction-generated $NO_{X,}$ traffic-generated CO hotspots, off-site mobile-source TACs, exposure to on-site generation of odorous emissions, and the need for a conformity analysis/conflict with Federal attainment planning would be less than significant, and therefore no residually significant impacts would occur.

3.2.5 CUMULATIVE IMPACTS

The project and the related projects are under the jurisdiction of the SMAQMD and are all located in the SVAB.

By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development within the SVAB, and this regional impact is a cumulative impact; projects within the SVAB would contribute to this impact only on a cumulative basis. No single project would be sufficient in size, by itself, to result in nonattainment of the regional air quality standards. Instead, a project's emissions may be individually limited, but cumulatively considerable when taken in combination with past, present, and future development projects. All new development in Sacramento County that results in an increase in air pollutant emissions above those assumed in regional air quality plans contributes to cumulative air quality impacts (SMAQMD 2009:8-1–8-2).

The project comprises one of the larger projects in the SVAB, similar in size to the proposed Arboretum project south of the SPA, but smaller than Cordova Hills to the east. The project's contribution to air pollutant emissions is expected to be similar to related projects in the region, and would have significant impacts on air quality in and of itself. An exceedance of the project-level thresholds does not necessarily constitute a significant cumulative impact (SMAQMD 2009:8-1). Because SunCreek is included in the Rancho Cordova General Plan and the MTP, the project is consistent with demographic projections (e.g., population, employment, VMT) assumed in the applicable air quality attainment plan, and a 15-point AQMP has been prepared in accordance with SMAQMD recommendations. The potential for significant cumulative effects resulting from development of the SPA, in addition to other projects in the nearby area and in the SVAB as a whole, is discussed below.

Criteria Air Pollutants: Temporary and Short-Term Construction Impacts

For all five action alternatives except the No USACE Permit Alternative, mitigated NO_X emissions from construction activities (after application of Mitigation Measure 3.2-1a) would still exceed SMAQMD's thresholds, in the absence of paying an off-site mitigation fee to offset NO_X emissions (Mitigation Measure 3.2-1b). Because the SPA is adjacent to several related projects that could be undergoing construction at the same time (Aboretum, Arista Del Sol, The Ranch at Sunridge, and Cordova Hills), it is possible that the impact of construction emissions of NO_X, resulting from development of the SPA and related projects, would be cumulatively considerable if emissions from all projects are not mitigated or offset within the region to less-than-significant levels. Considering the nonattainment status of Sacramento County and the SVAB for ozone, and considering the NO_X emissions of the related projects, construction of the SPA could result in a construction-related air quality impact that is considered a cumulatively considerable incremental contribution to a significant cumulative impact (increase in regional NO_X emissions and resulting ozone formation).

PM concentrations associated with construction of the project are considered significant and unavoidable even with implementation of Mitigation Measure 3.2-1a. The related projects adjacent to SunCreek, both built (Anatolia III) and proposed (Arboretum, Arista Del Sol, The Ranch at Sunridge, and Cordova Hills), may contain sensitive receptors that would be potentially exposed to construction emissions occurring in the SPA, depending on daytime wind speed and direction. Considering the PM emissions of the related projects, construction of the SPA could result in a construction-related air quality impact for PM_{10} and $PM_{2.5}$ that is considered a cumulatively considerable incremental contribution to a significant cumulative impact from exposure of sensitive receptors to PM_{10} and $PM_{2.5}$ construction-related emissions concentrations.

Criteria Air Pollutants: Long-Term Operational Impacts

The project would result in mass emissions of ROG and NO_X that exceed SMAQMD's significance threshold of 65 lb/day. Substantial operational emissions of PM would also occur as a result of project operation. Implementation of Mitigation Measure 3.2-2 (that is, implementation of the AQMP), would reduce impacts associated with emissions of CAP emissions, but not to less-than-significant levels. However, the SPA was included in the Rancho Cordova General Plan and the MTP, so the cumulative operational impacts were accounted for in attainment planning efforts.

PM emissions associated with the project would be substantially reduced by implementation of Mitigation Measure 3.2-2 (AQMP) and PM emissions are predominantly mobile source emissions that would be distributed across the transportation network and therefore would not contribute substantially to pollutant concentrations. However, ozone precursor emissions attributable to the project, plus emissions from other reasonably foreseeable future projects nearby, and in the SVAB as a whole, would continue to contribute to long-term increases in emissions that would exacerbate existing and projected violations and slow air quality attainment progress. Therefore, the project would result in a cumulatively considerable incremental contribution to a significant cumulative impact from exposure of sensitive receptors to long-term operational CAP emissions.

Toxic Air Contaminants

Activities related to temporary and short-term construction and long-term operation of the project could expose nearby existing off-site or proposed on-site sensitive receptors to TAC emissions. TAC emissions associated with temporary and short-term construction activities and stationary sources are site-specific, would be addressed through mitigation, and the impact is considered less than significant. The specific types of on-site commercial land uses have not yet been identified and could potentially generate substantial volumes of truck activity (e.g., warehouses, distribution centers) in the proximity of nearby sensitive receptors, thereby exposing these nearby on-site receptors to mobile-source operational TACs. However, the project's impact would be less than significant after implementation of Mitigation Measures 3.2-1a, 3.4-1, and 3.2-4 discussed above.

With regards to mobile-source TACs generated by cumulative traffic, related projects in the area, such as Arboretum, Ranch at Sunridge, and Cordova Hills (which also includes a university campus) would also develop land uses that would substantially increase traffic on nearby roadways, particularly Grant Line Road, and would subsequently increase emissions of off-site mobile-source TACs. Grant Line Road is of particular concern because it would accommodate a disproportionately high volume of diesel-powered truck trips, most of which would be associated with operation of the Teichert Quarry and other sand and gravel quarries northeast of the SPA. The substantial volume of traffic generated by the related projects would result in a cumulatively significant mobile-source TAC impact.

The cumulative land use compatibility of the SunCreek project with TAC-generating quarry truck volumes on Grant Line Road was assessed according to guidance provided by ARB's publication, *Air Quality and Land Use Handbook: A Community Health Perspective (Handbook)* (ARB 2005a), and SMAQMD's *Protocol* (SMAQMD 2011). The Land Use Handbook recommends that sensitive land uses be buffered by at least 500 feet from a freeway or major roadway. This recommendation "was based on traffic related studies that showed a 70 percent drop in PM concentrations at a distance of 500 feet from the roadway." (SMAQMD 2011) SMAQMD's *Protocol* provides more detailed guidance for assessing risk levels at receptors located close to a freeway or high-volume roadway. The guidance provided in SMAQMD's *Protocol* accounts for the orientation of the roadway (i.e., north-south or east-west), the orientation of the receptors relative to the roadway, the predominant wind direction, and the traffic volume during the peak traffic hour. The peak-hour traffic volumes used in this air quality analysis are based on the average daily traffic volumes and quarry truck volumes used in the traffic analysis prepared for this project (Fehr & Peers 2011). The *Protocol* uses the same 70-percent risk reduction approach as in the Land Use Handbook. Within Sacramento County, 276 excess cancer cases in one million is based on a hypothetical sensitive receptor located 50 feet from the edge of the nearest travel lane for the highest peak traffic volume reported by Caltrans for Sacramento County, reduced by 70% (SMAQMD 2011). If the screening criteria determine that the level of cancer would be lower than 276 in a million, the *Protocol* does not recommend further site specific analysis. If the level of cancer risk at a receptor is estimated to be greater than 276 in a million, the *Protocol* recommends the completion of a site-specific health risk assessment.

Both ARB's *Handbook* and SMAQMD's *Protocol* are considered screening level guidance and do not contain recommended thresholds of significance. However, in the absence of a recommended threshold of significance from ARB or SMAQMD, the City and USACE have decided to use their respective screening levels as the threshold of significance for evaluating roadside TAC exposure in this analysis.

Three proposed aggregate quarry projects north of Cordova Hills are expected to generate TACs on Grant Line Road, and project-generated sensitive receptors residential land uses under the No USACE Permit, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives) would be located within 500 feet of the roadway as buildout occurs within the SPA. Under the Proposed Project Alternative, commercial land uses, rather than residences, would be developed adjacent to Grant Line Road. The northeast portion of the SPA would be the last area to be constructed according to the project phasing map (see Exhibit 2-22 in Chapter 2, "Alternatives), and buildout of the easternmost area bordering Grant Line Road would occur sometime between 2025 and 2032. The SMAQMD Roadway Protocol uses 100,000 vehicles per day as a screening number. EMFAC 2007 results for Sacramento County indicate that diesel trucks (medium and heavy) comprise about 2% of the vehicle fleet in 2030, which equates to about 2,000 trucks in 100,000 vehicles (ARB 2006). Average daily quarry truck volumes (Fehr & Peers 2011) were estimated and used to evaluate the potential impact of high-volume roadway TAC emissions on sensitive receptors (detailed calculations are included in Appendix L). The number of quarry trucks modeled to determine exposures to sensitive receptors were 2,130, which just exceeds the basic SMAQMD Roadway Protocol screen, because the screen is based on approximately 2,000 trucks per day (out of 100,000 vehicles total).

Grant Line Road has a north-south orientation with respect to the SPA, and sensitive receptors would be located 20 to 130 feet to the west of the road (see Chapter 2, "Alternatives"). Approximately 213 trucks would be driving north-south on Grant Line Road during peak hour (daily truck volume by 10). Dividing 213 by 2% (the average medium and heavy diesel truck percentage in Sacramento County in 2030, see Section 3.15, "Traffic and Transportation" and Appendix L), results in about 10,650 peak hour vehicles. SMAQMD's screening tables, as well as overestimation of traffic/diesel truck numbers by rounding from 10,650 to 12,000 in peak hour (per protocol guidance), provide a conservative estimate of cancer risk.

NCP, BIM, ID

Under the No USACE Permit and Increased Development Alternatives, sensitive land uses would be located 20 feet from the west of the edge of Grant Line Road, which is anticipated to carry a disproportionately high percentage of heavy-duty vehicle trucks associated with the development of several new aggregate quarries. According to Table 2 of the Protocol (SMAQMD 2011:10), the incremental cancer risk associated with 12,000 vehicles/peak hour, with sensitive receptors located 20 feet from the west of the edge of the roadway (rounded down to 10 feet, per protocol guidance), results in an incremental cancer risk of about 429 in a million, which exceeds the evaluation criterion of 276 in a million. Under the Biological Impact Minimization Alternative, sensitive land uses would be located 40 feet west of the edge of Grant Line Road. According to Table 2 of the Protocol (SMAQMD 2011:10), the incremental cancer risk associated with 12,000 vehicles/peak hour, with sensitive receptors located 40 feet west of the edge of the roadway (rounded down to 25 feet, per protocol guidance), results in an incremental cancer risk of about 340 in a million, which exceeds the evaluation criterion of 276 in a million. (The evaluation criterion is a cancer risk value that is based on the reasonable worst-case siting situation within the boundaries of SMAQMD, and is used as the threshold of significance for the purposes of this DEIR/DEIS.) Therefore, on-site sensitive receptors would be exposed to substantial pollutant concentrations as a result of traffic generated by the related projects.

Mitigation Measure CUM AIR-1: Implement Measures to Reduce Exposure of Sensitive Receptors to Long-Term Operational Emissions of Toxic Air Contaminants.

For every proposed sensitive land use (i.e. residences, schools, playgrounds, day care centers, nursing homes, and medical facilities) in the SunCreek SPA within 50 feet of Grant Line Road, a HRA shall be performed by each individual project applicant to determine whether existing or proposed on-site sensitive receptors will be exposed to TAC emissions that exceed an incremental increase of 10 in 1 million for cancer risk and/or a noncarcinogenic HI of 1.0. If the results of the HRA indicate that the cancer risk or HI exceeds the above-mentioned limits, the individual project applicant shall employ measures to reduce exposures to levels below the limits, which may include one or more of the following:

- Where necessary to reduce exposure of sensitive receptors to a level that is below an incremental increase of 10 in 1 million for the cancer risk and/or a noncarcinogenic HI of 1.0, proposed sensitive land uses would:

  1. Plant a tree barrier along the entire SPA property line abutting Grant Line Road using an appropriate species of hardy, drought resistant, fast-growing, fine-needled evergreen trees (i.e., pine, cedar, or redwood, SMAQMD 2011, Fuller, et al., 2009). Density of planting should result in a semi-solid barrier to block out roadway pollution, while maintaining tree health.

2. Locate building air intakes on the sides of the SPA buildings that are more distant from the odor source and require levels of air filtration that exceed Title 24 standards or the local building codes.

3. Manage SPA buildings as systems with continuous positive pressure to prevent infiltration of unfiltered outside air.

4. Execute and record deed notices on SPA properties and provide copies to initial and subsequent prospective buyers, lessees, and renters of all properties within the SPA, particularly residential buyers, with information that their respective properties would potentially be subject to objectionable diesel exhaust from a known nearby DPM source.

The No USACE Permit, Biological Impact Minimization, and Increased Development Alternatives would generate substantial amounts of additional traffic on local roadways, as discussed in Section 3.15, "Traffic and Transportation" (and in Impact 3.2-2 above). While the Biological Impact Minimization alternative does not include commercial uses, the No USACE Permit and Increased Development Alternatives would also include 6.7 and 17.7 acres, respectively, of commercial land uses that would attract delivery truck traffic, which could contribute to DPM concentrations in the vicinity of the SPA. The specific types of commercial uses that would be developed within the SPA are not currently known, but grocery stores could attract approximately 20 delivery truck trips per day (one trip to the subject establishment and one trip away), whereas retail establishments may only have a few delivery truck trips per week (McCormack et al. 2010 and Pearson et al. 2009). The increased amount of passenger car, light-duty, and heavy-duty vehicle traffic generated by the project, when considered in combination with the vehicle traffic generated by the related projects (including heavy-duty quarry trucks), would result in a cumulatively considerable incremental contribution to a cumulatively significant off-site mobile-source operational TAC impact.

> **Mitigation Measure:** No feasible mitigation is available to reduce the cumulative mobile-source operational TAC impacts to off-site sensitive receptors. The City cannot adopt vehicle emissions controls or regulations on fuel content that would reduce the rate of TAC emissions from trucks and it is not feasible for the City to re-route potential delivery trucks associated with on-site uses such that the routes would avoid areas with sensitive receptors and quarry truck traffic.

PP, CS

Under the Proposed Project Alternative, commercial land uses would be located adjacent to Grant Line Road. The wind direction is predominantly from the south and the section of Grant Line Road of concern lies at the eastern edge of the SPA. Under the Conceptual Strategy Alternative, sensitive land uses would be located 130 feet from the west edge of Grant Line Road. According to Table 2 of the Protocol (SMAQMD 2011:10), the incremental cancer risk associated with 12,000 vehicles/peak hour, with sensitive receptors located 130 feet from the west edge of the roadway (rounded down to 100 feet, per protocol guidance), results in an incremental cancer risk of about 169 in a million, which does not exceed the evaluation criterion of 276 in a million. Therefore, on-site sensitive receptors under the Proposed Project and Conceptual Strategy Alternatives would not be exposed to substantial pollutant concentrations as a result of traffic generated by the related projects.

The Proposed Project and Conceptual Strategy Alternatives would generate substantial amounts of additional traffic on local roadways, as discussed in Section 3.15, "Traffic and Transportation" (and in Impact 3.2-2 above). The Proposed Project Alternative also anticipates the development of a 60-acre Local Town Center, along with 31.9 acres of Commercial Mixed Use, for a total of 91.9 acres of commercial land uses that could include hotels, restaurants, and grocery stores, along with a variety of retail shopping opportunities including large warehouse-style businesses. These commercial land uses would attract a substantial amount of delivery truck traffic, which could contribute to DPM concentrations in the vicinity of the SPA. (See also Impact 3.2-4, above.) The specific types of commercial uses that would be developed within the SPA are not currently known, but grocery stores could attract approximately 20 delivery truck trips per day (one trip to the subject establishment and one trip away), whereas retail establishments may only have a few delivery truck trips per week (McCormack et al. 2010 and Pearson et al. 2009). Therefore, the increased amount of passenger car, light-duty, and heavy-duty vehicle traffic generated by the project, when considered in combination with the vehicle traffic generated by the related projects (including heavy-duty quarry trucks), would result in a cumulatively considerable incremental contribution to a cumulatively significant off-site mobile-source operational TAC impact.

> **Mitigation Measure:** No feasible mitigation is available to reduce the cumulative mobile-source operational TAC impacts to off-site sensitive receptors. The City cannot adopt vehicle emissions controls or regulations on fuel content that would reduce the rate of TAC emissions from trucks and it is not feasible for the City to re-route potential delivery trucks associated with on-site uses such that the routes would avoid areas with sensitive receptors and quarry truck traffic.

Emissions attributable to the project, plus emissions from other reasonably foreseeable future projects nearby, and in the SVAB as a whole, would continue to contribute to long-term increases in emissions that could expose sensitive receptors to TAC emissions under all five action alternatives. Under the No USACE Permit, Biological Impact Minimization, and Increased Development Alternatives, implementation of Mitigation Measure CUM AIR-1, would require performance of an HRA to determine the incremental cancer risk of on-site sensitive land uses, and measures would be implemented to reduce on-site TAC exposure levels below the threshold. Therefore, the project would not result in a cumulatively considerable incremental contribution to a significant on-site cumulative impact from mobile-source TAC emissions. However, as discussed above, no feasible mitigation measures are available to reduce the project's contribution to off-site cumulatively significant mobile-source TAC emissions. Therefore, this cumulative impact would be significant and unavoidable for all five action alternatives.

Carbon Monoxide

The traffic modeling for cumulative (2032) conditions, which includes project-generated traffic and traffic generated by the related projects (Fehr & Peers 2010), indicates that less-than-significant air quality impacts from mobile sources of CO would occur (see Impact 3.2-3 and Appendix L for further details). CO emission factors in future years are expected to be lower than current levels due to more stringent vehicle emissions standards and improvements in vehicle emissions technology. Thus, ambient local CO concentrations under cumulative conditions would continue to decline. Therefore, 1- and 8-hour CO concentrations for the future cumulative conditions would not be anticipated to exceed the significance thresholds of 20 ppm and 9 ppm, respectively. Consequently, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact from exposure of sensitive receptors to CO emissions from mobile sources.

Odor Impacts

The following analysis is provided for NEPA purposes only. CEQA does not require an analysis of the impact of the existing environment on the project.

Construction activities associated with both the SPA and the related projects could expose sensitive receptors to odorous emissions. Also, operation-related activities at proposed commercial areas, both within the SPA and within the related projects, could result in emissions of odors from such land uses as fast food restaurants, bakeries, and nail salons in close proximity to proposed sensitive receptors.

Odor emissions associated with construction and operation of the project would be reduced to a less-than-significant level after implementation of Mitigation Measures 3.2-4 and 3.2-5 identified above. Both the project and the related projects (e.g., Arboretum) would result in exposure of additional new sensitive receptors to odor sources in the area (i.e., Sacramento Rendering Company, the Kiefer Landfill, and Lopez Ag Service), as well as exposure of sensitive receptors to future mobile- and stationary-source odors generated within the SPA and adjacent developments. Another proposed project, the Kiefer Landfill Special Planning Area, would include expansion of the current Kiefer landfill (described in the "Affected Environment" section above) to within approximately 1 mile of the SunCreek SPA. The proposed expansion of the Kiefer Landfill (not including the buffer area) includes 651 acres of new landfill area, and would be located approximately 0.5-0.8 miles south of the easternmost portion of the SunCreek SPA. An additional 569 acres slated for industrial waste processing activities would be located adjacent to the new landfill area and again, within about 0.5-0.8 miles south of the easternmost portion of the SPA. Although the new landfill and waste processing activities/facilities would presumably be permitted facilities, the potential exists for odor emissions to occur within 1 mile of the SPA, which would fall within the current SMAQMD-recommended screening distance of 1 mile and therefore could generate objectionable odors at the SPA.

Existing odor sources in the vicinity of the SPA, along with expansion of the Kiefer Landfill, could result in potentially significant cumulative impacts related to odorous emissions. However, the project's odor emissions are not expected to generate any odor-related complaints to SMAQMD, and the project does not include similar odors that would combine with odors from activities in the vicinity of the SPA to substantially increase the severity or extent of odor-related impacts. In addition, project-related odor effects would be reduced through the implementation of mitigation measures described above. Therefore, the project's short-term construction odor emissions and long-term operational odor emissions would not result in a cumulatively considerable incremental contribution to a significant cumulative impact.

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3.3 BIOLOGICAL RESOURCES

3.3.1 AFFECTED ENVIRONMENT

The SPA is located in the southeastern portion of Sacramento County within the City of Rancho Cordova. The SPA is characterized by annual grassland and vernal pools on undulating topography with elevations ranging from approximately 120 to 230 feet above mean sea level. The SPA is within the Laguna Formation, and is located in the Southeastern Sacramento Valley Vernal Pool Region. A tributary of Laguna Creek traverses the SPA entering at the northwest corner of the Grantline 220 property and flows generally to the southwest. Historic land uses in the surrounding area include cattle ranching, farming, and mining activities, primarily gold mining. The SPA has been used for cattle grazing since the early 1970s.

AECOM biologists conducted reconnaissance-level surveys of the SPA on November 10, 2005 and May 29, 2007. These surveys consisted of walking meandering transects throughout the SPA. The purpose of the surveys was to characterize and map biological resources present on the SPA.

Biological resource surveys that have been conducted at the SPA and were used as sources of information for this document include:

- *Draft Biological Resources Assessment for ±1260-Acre Sunrise Douglas 2 Specific Plan City of Rancho Cordova, California* (Foothill Associates 2004);
- *Special-status Species Determination for Participating Members of the Sunrise Douglas Property Owners Association within the Sunrise-Douglas Specific Plan Area, Sacramento County, California* (Sugnet & Associates 1993);
- *Special Status Plant Survey for Shalako Property.* Dated: November 29, 2005. Unpublished report prepared for Pardee Homes (ECORP 2005a);
- *Special Status Plant Survey for Sierra Sunrise.* Dated: December 21, 2005. Unpublished report prepared for Lennar Communities (ECORP 2005b);
- *Special Status Plant Survey for Shalako Property.* Dated: 6 August 2008. Unpublished report prepared for Shalako Investors (ECORP 2008a);
- *Special Status Plant Survey for Sierra Sunrise.* Dated: 15 August 2008. Unpublished report prepared for Lennar Communities (ECORP 2008b);
- *Special Status Plant Survey for Jaeger Ranch*. Dated: 9 September 2008. Unpublished report prepared for Investek Properties, LLC (ECORP 2008c);
- *Special Status Plant Survey for Smith Property.* Dated: 15 August 2008. Unpublished report prepared for Sierra Holdings (ECORP 2008d);
- *Memo: Orcutt Grass Surveys on Sunrise Douglas II Project* (Foothill Associates 2003);
- *Wetlands Map, Sun Creek* (formerly known as Sunrise Douglas II) Project (Davis[2], no date provided);
- *Delineation of Waters of the United States, Grant Line ±220 Acre Site* (Foothill Associates 2005) and *Final Map - Grant Line 220 Delineated Waters of the United States* (Foothill Associates 2007);

- *Delineation of Waters of the United States, Kamilos ±160 Acre Site* (Foothill Associates 2005) and *Final Map – Kamilos 160 Delineated Waters of the United States* (Foothill Associates 2007);
- *Wetland Delineation for Shalako Property*. Dated: 2001. (ECORP 2007a);
- *Wetland Delineation for Jaeger Ranch*. Dated: 2001. (ECORP 2007b); and
- *Revised Wetland Delineation for Sierra Sunrise Property*. Dated: 21 August 2007. (ECORP 2007c).

VEGETATION

The landscape in the SPA is characterized by undulating topography. This undulating topography and an underlying hardpan soil support a mosaic of vernal pools and seasonal wetland swales interspersed within a matrix of annual grassland vegetation. A large seasonal drainage that is tributary to Laguna Creek also traverses the SPA in a north to southwest direction. The drainage is not formally named on area maps, but is known locally as Sun Creek and referred to as Kite Creek in County drainage plans. In this DEIR/DEIS, the tributary drainage is referred to as Kite Creek. Several clusters of trees and shrubs are present in the SPA, primarily at the sites of the four existing and former residences, and these consist of nonnative ornamental species including eucalyptus (*Eucalyptus* spp.), silk tree (*Albizia julibrissin*), and white mulberry (*Morus alba*), as well as willow (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), and blue elderberry (*Sambucus mexicana*) around the two on-site ponds.

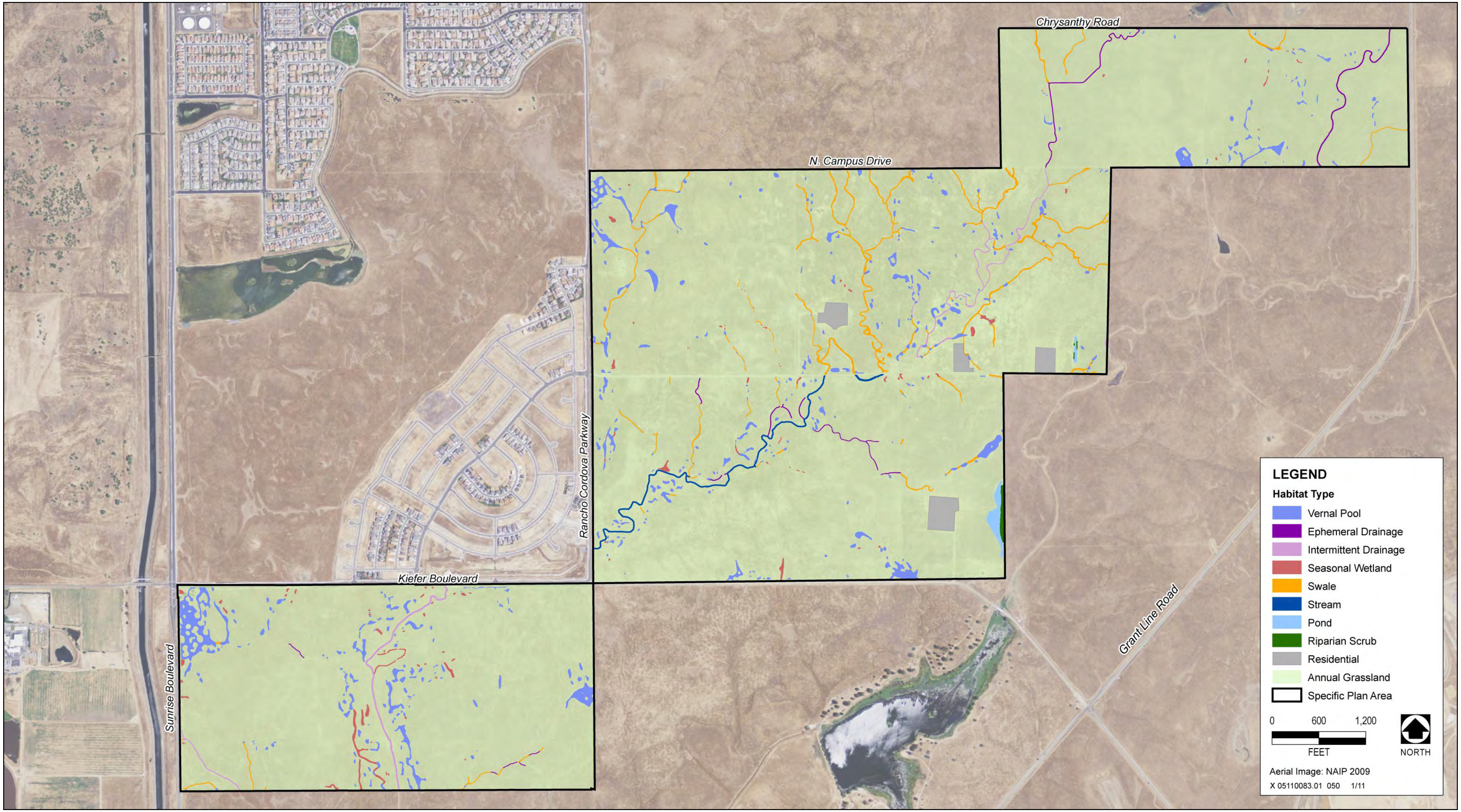
The annual grassland community present in the SPA is described below and depicted in Exhibit 3.3-1. Plant community nomenclature and descriptions are based on Holland (1986) with some modifications to reflect local variation. Vernal pools and other wetlands are discussed under the “Sensitive Biological Resources” section below.

WILDLIFE

Annual Grassland

Annual grassland covers the entire SPA with the exception of the seasonal drainage channel (Kite Creek), the vernal pools and swales, ponds, and impervious surfaces associated with the four existing residences. Annual grasslands are typically composed of a diverse assemblage of native and nonnative annual grasses and native and nonnative forbs, also predominantly annuals, but generally also containing a lot of perennial forbs, especially members of the lily family. Species composition and abundance vary considerably in annual grasslands depending on site factors such as soil chemistry and texture, topography, and disturbance regime. In addition, species composition and abundance vary temporally from season to season and year to year (Sawyer, Keeler-Wolf, and Evans 2009:30). Annual grassland in the SPA is characterized by dense herbaceous cover dominated by nonnative grasses and forbs including medusa head (*Taeniatherum caput-medusae*), soft chess (*Bromus hordeaceus*), barley (*Hordeum murinum* ssp. *leporinum*), ripgut brome (*Bromus diandrus*), and yellow starthistle (*Centaurea solstitialis*). However, native plants are an important component of the on-site annual grassland community and include harvest brodiaea (*Brodiaea elegans*), wild hyacinth (*Triteleia hyacinthina*), miniature lupine (*Lupinus bicolor*), Fitch’s tarweed (*Hemizonia fitchii*), and California poppy (*Eschscholzia californica*).

The habitat in the SPA attracts numerous common wildlife and special-status species found within Sacramento County. The vernal pools, swales, seasonal wetlands, seasonal drainages, and stock ponds in the SPA provide shelter, food, and nursery habitat for a great number of special-status and common invertebrates, amphibians, reptiles, birds, and mammal species. Annual grassland habitat is abundant, contiguous, and relatively flat making it popular for foraging raptors and many common wildlife species. Patches of isolated trees provide breeding habitat for resident raptors. The special-status wildlife species known and expected to occur on the SPA are addressed under “Sensitive Biological Resources”.



Sources: MacKay & Somps 2010 and ECORP 2010, Adapted by AECOM in 2010

Plant Communities and Waters of the United States in the SPA **Exhibit 3.3-1**

SENSITIVE BIOLOGICAL RESOURCES

Sensitive biological resources addressed in this section include those that are afforded special protection through the California Environmental Quality Act (CEQA), California Fish and Game Code (including the California Endangered Species Act [CESA]), Federal Endangered Species Act (ESA), Clean Water Act (CWA), Porter Cologne Act, and local planning documents including the County of Sacramento General Plan (1993), the proposed *Draft South Sacramento Habitat Conservation Plan* (SSHCP), and the *Rancho Cordova General Plan* (City General Plan) (City of Rancho Cordova 2006).

Special-Status Species

Special-status species are defined as species that are legally protected or that are otherwise considered sensitive by Federal, state, or local resource agencies. Special-status species are species, subspecies, or varieties that fall into one or more of the following categories, regardless of their legal or protection status:

- officially listed by California or the Federal government as endangered, threatened, or rare;
- a candidate for state or Federal listing as endangered, threatened, or rare;
- taxa (i.e., taxonomic category or group) that meet the criteria for listing, even if not currently included on any list, as described in California Code of Regulations (CCR) Section 15380 of the State CEQA Guidelines;
- species identified by the California Department of Fish and Game (DFG) as Species of Special Concern;
- species afforded protection under local planning documents; and
- taxa by the DFG to be “rare, threatened, or endangered in California” and included in the California Rare Plant Rank (CRPR). The DFG system includes five rarity and endangerment ranks for categorizing plant species of concern, which are summarized as follows:
  - CRPR 1A - Plants presumed to be extinct in California;
  - CRPR 1B - Plants that are rare, threatened, or endangered in California and elsewhere;
  - CRPR 2 - Plants that are rare, threatened, or endangered in California but more common elsewhere;
  - CRPR 3 - Plants about which more information is needed (a review list); and
  - CRPR 4 - Plants of limited distribution (a watch list).

All plants with a CRPR are considered "special plants" by DFG. The term “special plants” is a broad term used by DFG to refer to all of the plant taxa inventoried in DFG’s California Natural Diversity Database (CNDDB), regardless of their legal or protection status. Plants ranked as CRPR 1A, 1B, and 2 may qualify as endangered, rare, or threatened species within the definition of State CEQA Guidelines CCR Section 15380. DFG recommends, and local governments may require, that CRPR 1A, 1B, and 2 species be addressed in CEQA projects. In general, CRPR 3 and 4 species do not meet the definition of endangered, rare, or threatened pursuant to CEQA Section 15380; however, these species may be evaluated by the lead agency on a case by case basis to determine significance criteria under CEQA.

The term “California species of special concern” is applied by DFG to animals not listed under the Federal ESA or the CESA, but that are nonetheless declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist. DFG’s fully protected status was California’s first attempt to identify and protect animals that were rare or facing extinction. Most species listed as fully protected were eventually listed as threatened or endangered under CESA, however some species remain listed as fully protected but do not have simultaneous listing under CESA. Fully protected species may not be taken or possessed at any time and no take permits can be issued for these species except for scientific research purposes or for relocation to protect livestock.

Tables 3.3-1 and 3.3-2 below provide a list of special-status species known or with potential to occur in the SPA. These lists were developed through a review of biological studies previously conducted in the SPA and vicinity and habitat observations made during field surveys conducted for this project. The CNDDB (2010) and CNPS Inventory (CNPS 2010) were also reviewed for specific information on previously documented occurrences of special-status species in the Buffalo Creek, Carbondale, Carmichael, Citrus Heights, Clarksville, Elk Grove, Folsom, Folsom SE, and Sloughhouse U.S. Geological Survey quadrangles. A number of special-status species have been documented elsewhere in Sacramento County but are not addressed in this DEIR/DEIS. These consist of species that occurred historically but are considered to be extirpated from the County; species that are restricted to higher elevations (i.e., foothill locations) in the County; and species that are restricted to habitats that are not present in the SPA. Exhibit 3.3-2 shows all of the special-status species occurrences that have been documented in the CNDDB within 5 miles of the SPA.

Special-status Plants

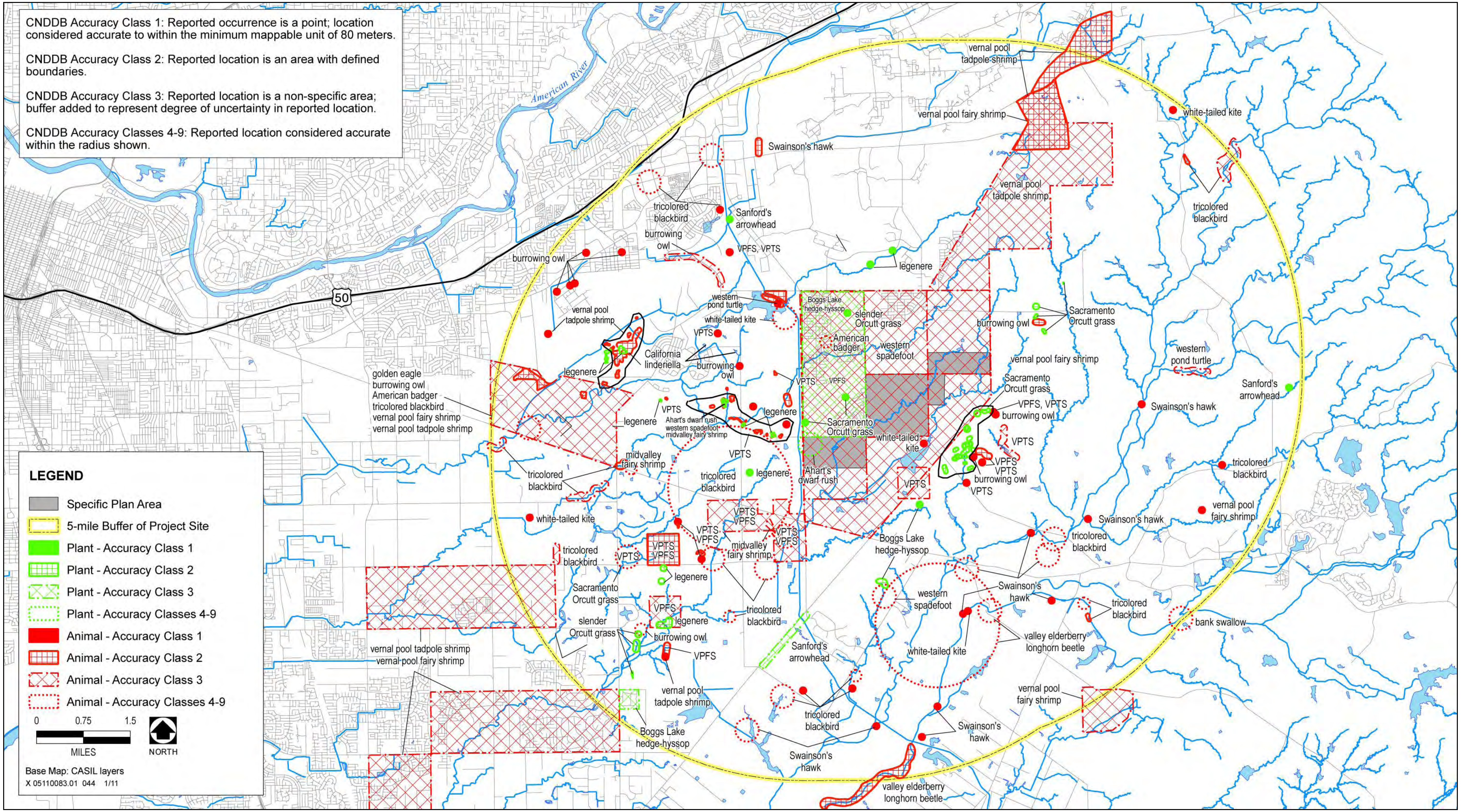
Based on review of the CNDDB and California Native Plant Society (CNPS) database searches, previously prepared biological reports for the project and surrounding areas (which included field surveys), and reconnaissance-level field surveys conducted by AECOM, it was determined that the SPA supports potentially suitable habitat for 10 special-status plant species. Brief descriptions of these species and their potential to occur in the SPA are provided in Table 3.3-1.

Special-status plant surveys have been conducted in the SPA in accordance with guidelines established by the U.S. Fish and Wildlife Service (USFWS) and DFG. Surveys for all potentially occurring special-status plant surveys were conducted by Sugnet & Associates in 1993 and by ECORP in 2005 and 2008. In addition, protocol surveys of the SPA were conducted specifically for Sacramento Orcutt grass and slender Orcutt grass by Foothill Associates during July 2003. No special-status plants were identified during any of these surveys.

There is a CNDDB record of Ahart's dwarf rush in the SPA. Four plants were reportedly found in a vernal pool near the southeast corner of Keifer Boulevard and Sunrise Boulevard on the Shalako property, but there is no date given for this record. This species was not found during special-status plant surveys conducted by Sugnet & Associates in spring 1993 or during surveys conducted by ECORP in 2005 and 2008. Therefore, it is assumed that this reported occurrence of Ahart's dwarf rush has been extirpated.

Because multiple surveys have been conducted during the appropriate blooming periods when target species would have been clearly identifiable, special-status plant species are considered to be absent from the SPA at this time. The results of protocol-level special-status plant surveys are typically considered valid by the resource agencies for a period of approximately 5 years, given that circumstances on the SPA can be assumed to remain largely unchanged during this amount of time.

Several other special-status plant species were identified in the data base searches for the selected quadrangles. These species are Ione manzanita (*Arctostaphylos myrtifolia*), Pine Hill buckbrush (*Ceanothus roderickii*), Red Hills soaproot (*Chlorogalum grandiflorum*), Brandegee's clarkia (*Clarkia biloba* ssp. *brandegeae*), Ione buckwheat (*Eriogonum apricum* var. *apricum*), Irish Hill buckwheat (*Eriogonum apricum* var. *prostratum*), Pine Hill fremontia (*Fremontodendron decumbens*), El Dorado bedstraw (*Galium californicum* ssp. *sierrae*), Bisbee Peak rush-rose (*Helianthemum suffrutescens*), Parry's horkelia (*Horkelia parryi*), Layne's ragwort (*Senecio layneae*), and El Dorado wyethia (*Wyethia reticulata*). These species do not have the potential to occur in the SPA due to specific habitat requirements that do not exist in the SPA such as chaparral or cismontane woodland habitats or gabbroic, serpentinite, or Ione soils. Although there is a CNDDB record of Hartweg's golden sunburst



Source: CNDDB June 2010

CNDDB Occurrences within 5 Miles of the SPA **Exhibit 3.3-2**

Table 3.3-1
Special-Status Plant Species Known or with Potential to Occur in the SPA

Species	Listing Status			Habitat and Blooming Period	Potential for Occurrence
	Federal[a]	State[b]	CRPR[c]		
Plants					
Dwarf downingia *Downingia pusilla*	--	--	2.2	Vernal pools and other mesic sites in valley and foothill grassland. Blooms March-May	Not present. Suitable habitat is present in vernal pools and swales. The nearest CNDDB occurrence is greater than 5 miles from the SPA and this species was not found during protocol-level surveys.
Tuolumne button-celery *Eryngium pinnatisectum*	--	--	1B.2	Vernal pools or other seasonal wetlands in cismontane woodland and lower montane coniferous forest. Blooms June-August	Not present. No woodland or coniferous forest habitat is present in the SPA and this species was not found during protocol-level surveys.
Bogg's Lake hedge hyssop *Gratiola heterosepala*	--	E	1B.2	Lake margin marshes and swamps, vernal pools, and other seasonal wetlands, primarily in clay soils. Blooms April–August	Not present. Suitable habitat is present in vernal pools and there are known CNDDB occurrences within 2 miles of the SPA, but this species was not found during protocol-level surveys.
Ahart's dwarf rush *Juncus leiospermus* var. *ahartii*	--	--	1B.2	Vernal pools and swales in areas of low cover of competing vegetation; most often on gopher turnings along margins of pools or swales (Witham 2006:38). Blooms March–May	Not present. Suitable habitat is present in vernal pools and swales and there is a historic record of this species documented in the SPA, but this species was not found during protocol-level surveys.
Greene's legenere *Legenere limosa*	--	--	1B.1	Relatively deep and wet vernal pools. Blooms April-June	Not present. Suitable habitat is present in vernal pools and there are known CNDDB occurrences within 1 mile of the SPA but this species was not found during protocol-level surveys.
Pincushion navarretia *Navarretia meyersii* ssp. *meyersii*	--	--	1B.1	Vernal pools. Blooms in May	Not present. Suitable habitat is present in vernal pools and swales, but this species was not found during protocol-level surveys.
Slender Orcutt grass *Orcuttia tenuis*	T	E	1B.1	Vernal pools. Blooms May-October	Not present. Suitable habitat is present in vernal pools and swales. The nearest CNDDB occurrence is approximately 1 mile from the SPA. This species was not found during protocol-level surveys.

Table 3.3-1
Special-Status Plant Species Known or with Potential to Occur in the SPA

Species	Listing Status			Habitat and Blooming Period	Potential for Occurrence
	Federal[a]	State[b]	CRPR[c]		
Sacramento Orcutt grass *Orcuttia viscida*	E	E	1B.1	Vernal pools. Blooms April-July	Not present. Suitable habitat is present in vernal pools and swales. The nearest CNDDB occurrence is less than a quarter mile from the SPA, but this species was not found during protocol-level surveys.
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B.1	Shallow, well-drained, medium-textured soils in cismontane woodland and valley and foothill grassland; predominantly on northern slopes of mima mounds but also near vernal pools. Blooms March-April	Not present. The SPA is outside of species' currently known range. Nearest known record is from 1939 in El Dorado County. This species was not found during protocol-level surveys.
Sanford's arrowhead *Sagittaria sanfordii*	--	--	1B.2	Shallow freshwater marshes and swamps. Blooms May-October	Not present. Suitable marsh habitat is lacking from the on-site stock ponds. The nearest CNDDB occurrence is approximately 2 miles from the SPA. This species was not found during protocol-level surveys.

[a] U.S. Fish and Wildlife Service—Federal Listing Categories:
T =Threatened
E =Endangered
– =No status
[b] California Department of Fish and Game—State Listing Categories:
R =Rare
E =Endangered
– =No status
[c] California Rare Plant Ranks:
1A =Presumed extinct
1B =Plants rare, threatened, or endangered in California and elsewhere
2 =Plants rare, threatened, or endangered in California, but more common elsewhere
Extensions:
.1 =Seriously endangered in California (>80 percent of occurrences are threatened and/or high degree and immediacy of threat)
.2 =Fairly endangered in California (20–80 percent of occurrences are threatened)
.3 =Not very endangered in California (<20 percent of occurrences are threatened or no current threats are known)
Sources: CNDDB 2010, CNPS 2010, Sugnet & Associates 1993, Foothill Associates 2003, ECORP 2005, ECORP 2008,Compiled by AECOM in 2011

Table 3.3-2 Special-Status Wildlife Species Known or with Potential to Occur on the SPA				
Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
Invertebrates				
Vernal pool fairy shrimp *Branchinecta lynchi*	T	--	Vernal pools, swales, and ephemeral freshwater habitat in valley and foothill grasslands.	Known to occur; species presence was documented in 1993 and 2004.
Vernal pool tadpole shrimp *Lepidurus packardi*	E	--	Vernal pools, swales, and ephemeral freshwater habitat in valley and foothill grasslands.	Known to occur; species presence was documented in 1993 and 2004.
Conservancy fairy shrimp *Branchinecta conservatio*	E	--	Most often in relatively large, muddy vernal pools in valley grasslands. All known pools containing this species are at least moderately turbid. Requires an average of 49 days of continual inundation to mature (Eriksen and Belk 1999:88-89).	Unlikely to occur; pools in the SPA do not meet typical habitat conditions. Currently known distribution does not include Sacramento County or the Southeastern Sacramento Valley Vernal Pool Region (USFWS 2005, 2007).
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/PD	--	Elderberry shrubs.	Could occur; elderberry shrubs present. Nearest CNDDB occurrence (1987) approximately 2 miles south of the SPA.
Amphibians and Reptiles				
Western pond turtle *Actinemys marmorata*	--	SC	Freshwater marsh, ponds, lakes, and rivers with basking sites.	Could occur; suitable habitat present. The nearest CNDDB occurrence (2007) is approximately 2 miles northwest of the SPA.
California tiger salamander *Ambystoma californiense*	T	SC	Vernal pools and seasonal wetlands with a minimum 10-week inundation period and surrounding uplands, primarily grasslands, with burrows and other belowground refugia (e.g., rock or soil crevices).	Unlikely to occur; potentially suitable habitat present on-site but extensive surveys in the project vicinity have not detected this species north of the Cosumnes River (69 FR 47212, August 4, 2004).
Western spadefoot *Spea hammondii*	--	SC	Vernal pools and other seasonal ponds in valley and foothill grasslands.	Known to occur; suitable breeding and foraging habitat present. CNDDB occurrence (1978) in the SPA and species was observed on the Shalako property in 1993.
California red-legged frog *Rana aurora draytonii*	T	SC	Foothill streams with dense shrubby or emergent riparian vegetation, minimum 11-20 weeks of water for larval development, and upland refugia for aestivation.	Unlikely to occur; presumed extirpated from the valley floor.

Table 3.3-2
Special-Status Wildlife Species Known or with Potential to Occur on the SPA

Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
Giant garter snake *Thamnophis gigas*	T	T	Slow-moving streams, sloughs, ponds, marshes, inundated floodplains, rice fields, and irrigation and drainage ditches on the Central Valley floor with mud bottoms, earthen banks, and emergent vegetation. Also require upland refugia not subject to flooding during inactive season.	Unlikely to occur; no suitable habitat is present in the SPA and southern Sacramento Valley populations are known only from the American Basin and Delta Basin (USFWS 2006a).The nearest CNDDB occurrence is greater than 5 miles from the SPA.
Birds				
Tricolored blackbird *Agelaius tricolor* (nesting colony)	--	SC	Forages in agricultural land and grasslands; nests in marshes and other areas that support cattails or dense thickets.	Unlikely to occur; may currently forage on site, but no suitable nesting habitat is present. Flocks observed foraging on the Grantline 220 and Shalako properties in 1993.
Grasshopper sparrow *Ammodramus savannarum* (nesting)		SC	Forages and nests in dense grasslands; favors a mix of native grasses, forbs, and scattered shrubs.	Could occur; suitable foraging and nesting habitat present. The nearest CNDDB occurrence is greater than 5 miles from the SPA.
Golden eagle *Aquila chrysaetos* (nesting)	–	FP	Open grassland and oak savannah with large trees or cliffs for nesting.	Unlikely to occur; may forage on site during non-breeding season, but no suitable nesting habitat is present. An immature golden eagle was observed foraging on the Sierra Sunrise property in April 1993.
Short-eared owl *Asio flammeus* (nesting)	--	SC	Forages and nests in grasslands and other open habitats.	Unlikely to occur; SPA is outside species' known breeding range. Could forage on site; one short-eared owl was observed foraging on the Shalako property in April 1992.
Western burrowing owl *Athene cunicularia* (burrow sites)	--	SC	Forages and nests in grasslands, agricultural land, and open woodlands.	Known to occur; suitable foraging and nesting habitat are present. Observed on-site during reconnaissance surveys by AECOM biologists on November 10, 2005.
Swainson's hawk *Buteo swainsoni* (nesting)	--	T	Forages in grasslands and agricultural land, nests in riparian and isolated trees.	Could occur; suitable foraging and nesting habitat present. Species was observed nesting on the adjacent Waegell (Arboretum project) property in 2007 (EDAW [now AECOM] 2007).
Northern harrier *Circus cyaneus* (nesting)	--	SC	Forages and nests in grasslands, marshes, and agricultural areas.	Known to occur; suitable foraging and nesting habitat present. Observed by Foothill Associates (Foothill Associates 2004) and by AECOM biologists on November 10, 2005.

Table 3.3-2 Special-Status Wildlife Species Known or with Potential to Occur on the SPA				
Species	**Listing Status**[1]		**Habitat**	**Potential for Occurrence**
	Federal	**State**		
White-tailed kite *Elanus leucurus* (nesting)	–	FP	Forages in grasslands and agricultural fields; nests in trees in riparian zones, oak woodlands, and isolated trees.	Could occur; suitable foraging habitat and limited nesting habitat present. There are several records of white-tailed kite nesting in the project vicinity and the species has been observed foraging in the SPA. The nearest CNDDB nesting occurrence (1990) is at Blodgett Reservoir, south of the SPA on the Arboretum project site.
Southern bald eagle *Haliaeetus leucocephalus* (nesting and wintering)	D	E	Lake margins and rivers for both nesting and wintering. Uses large trees for nesting. Roosts communally in winter.	Unlikely to occur; no suitable nesting or foraging habitat present.
Loggerhead shrike *Lanius ludovicianus* (nesting)	--	SC	Forages in grasslands, shrublands, and open woodlands. Nests in trees or shrubs.	Could occur; suitable foraging habitat and limited nesting habitat present. This species was observed nesting on the adjacent Waegell property (Arboretum project) in 2007 (EDAW [now AECOM] 2007) and was observed foraging on the Shalako property in 1993.
Bank swallow *Riparia riparia* (nesting)	–	T	Nests in colonies in unvegetated vertical banks with fine-textured, sandy soils, typically next to streams, rivers, or lakes, occasionally in gravel quarries or other eroding bluffs. Forages in a variety of habitats near nests.	Unlikely to occur; no suitable habitat present.
Mammals				
Pallid bat *Anthrozous pallidus*	–	SC	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats. Roosts in rock crevices, oak hollows, bridges, or buildings.	Unlikely to occur; no suitable nesting or roosting habitat present.
American Badger *Taxidea taxus*	--	SC	Forages and burrows in open shrub, forest, and herbaceous habitats with friable soils.	Likely to occur; suitable burrowing habitat present. Nearest CNDDB occurrence (1990) approximately 1 mile north of SPA in grazed annual grassland with vernal pools.

Notes: SPA = specific plan area; FR = Federal Register; CNDDB = California Natural Diversity Database

[1] **Legal Status Definitions**

<u>U.S. Fish and Wildlife Service (USFWS)</u>

E Endangered (legally protected) T Threatened (legally protected)

<u>California Department of Fish and Game (DFG)</u>

E Endangered (legally protected) T Threatened (legally protected)

FSC Federal Species of Concern (no formal protection) CSC California Species of Concern (no formal protection)

FP Fully Protected (legally protected)

Sources: CNDDB 2010; Foothill Associates 2004, Sugnet & Associates 1993, Compiled by AECOM in 2010

(*Pseudobahia bahiifolia*) within the nine quadrangle search area, the species is not expected to occur in the SPA because there is just one historic record of this species in the area from 1939 in El Dorado County. All other records of this species are from Fresno, Madera, Merced, Stanislaus, and Yuba Counties (Yuba occurrence thought to be extirpated) and so the SPA is outside of the currently known range of this species.

Special-status Wildlife

Based on the results of the CNDDB search, previously prepared biological reports for the project and surrounding areas (including field surveys), and the reconnaissance-level surveys conducted by AECOM on November 10, 2005 and June 7, 2007, it was determined that 12 special-status wildlife species have potential to be present in the SPA (Table 3.3-2). An additional 11 species were determined to be unlikely to occur in the SPA either because suitable habitat is lacking for at least some portion of their life cycle or because the SPA is outside of the species' currently known range.

Vernal Pool Invertebrates. Several invertebrate species are specially adapted to life in vernal pools and other seasonal wetland habitats for at least part of their life cycle. Vernal pool fairy shrimp and vernal pool tadpole shrimp are small crustaceans (1/2–2 inches long) that are restricted to vernal pools, swales, and other seasonal wetlands. Eggs of these species lie dormant during most of the year in the form of cysts, which are capable of withstanding extreme environmental conditions, such as heat, cold, and prolonged desiccation. The cysts hatch when the pools fill with rainwater, and the young rapidly develop into sexually mature adults. Not all of the cysts hatch with the first rainfall; some remain dormant to hatch during subsequent events or in later years.

Vernal pool invertebrates occupy a variety of seasonal aquatic habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. They can live in wetlands ranging from small pools several square feet in area to large vernal lakes of more than 50 acres (USFWS 2005). In addition, vernal pool tadpole shrimp are adapted to life in water bodies that convey flows, such as Kite Creek. Vernal pool fairy shrimp, however, are not adapted for life in flowing water bodies and Kite Creek does not provide suitable habitat for this species. Habitat for vernal pool invertebrates has become highly fragmented and continues to be threatened by conversion to urban and agricultural uses. Almost three-quarters of the historic vernal pool habitat in the Central Valley was estimated to have been lost by 1997 (USFWS 2005). An additional 13% of Central Valley vernal pools were lost as a result of habitat conversion between 1997 and 2005 (Holland 2009).

Federally listed vernal pool fairy shrimp and vernal pool tadpole shrimp were identified during field surveys by Sugnet & Associates in 1993 (Sugnet & Associates 1993) and surveys conducted by Foothill Associates biologists in February 2004. The CNDDB lists 55 occurrences of these Federally listed vernal pool crustaceans within a 5-mile radius around the SPA.

The SPA lies within the Southeastern Sacramento Valley vernal pool region, which supports the highest concentration of documented vernal pool tadpole shrimp occurrences (35% of the CNDDB records for this species). Sacramento County supports the highest percentage (28%) of vernal pool tadpole shrimp occurrences of any county in California (USFWS 2005). Furthermore, the SPA is within the Mather Core Area, an area identified by USFWS in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (recovery plan) (USFWS 2005) as vital not only to the recovery of vernal pool tadpole shrimp, but to preventing the extinction or irreversible decline of the species. USFWS estimates that approximately 74% of the vernal pool tadpole shrimp occurrences in Southeastern Sacramento Valley are in the Mather Core Area.

Valley Elderberry Longhorn Beetle. The valley elderberry longhorn beetle (VELB) is Federally listed as threatened. It is completely dependent on its host plant, blue elderberry (*Sambucus mexicana*), during its entire life cycle, and is generally restricted to California's Central Valley and adjacent foothills. Larvae of these beetles live within the soft pith of the elderberry shrub where they feed for 1 to 2 years. Adults emerge from inside the wood of elderberry shrubs during the spring as the plant begins to flower. The adults feed on the elderberry foliage up until they mate. Females lay their eggs in the crevices of elderberry bark. Upon hatching, the larvae tunnel into the stems of the shrub to feed. The beetles typically use stems that are greater than one inch in diameter at ground level. Beetle populations in the state have decreased largely due to historical loss of riparian habitat in the Central Valley. However, a 5-year review of the species, required by Section 4(c)(2)(A) of the ESA, was completed by USFWS in October 2006 and the recommendation was that the beetle be delisted as a result of recent restoration efforts that have led to an increase in available habitat for the species (USFWS 2006b). This recommendation is not a guarantee that the species will be delisted, however, because formal changes in the classification of listed species require a separate USFWS rulemaking process distinct from the 5-year review.

A large elderberry shrub that could provide suitable habitat for VELB was observed at the pond in the southeast corner of the Sierra Sunrise property during the June 2007 reconnaissance survey conducted by AECOM. No characteristic exit holes were observed on the stems of this shrub. The nearest known occurrence of VELB is approximately 2 miles south of the SPA. Given the presence of suitable habitat and known occurrence of VELB nearby, this species could be present in the SPA.

Amphibians and Reptiles. Western pond turtle is a California species of concern. Western pond turtle habitat includes streams, large rivers, and slow-moving water. They are most common in areas with large rocks and boulders, where they bask in the sun. Nests are typically located on unshaded upland slopes in dry substrates with sandy clay or silt soils excavated by the female up to 1,300 feet (but usually less) from the aquatic habitats where they occur. Suitable aquatic habitat in the SPA consists of the two stock ponds. Grassland slopes on the site may provide suitable upland nesting habitat. The nearest known occurrence of western pond turtle is at Mather Lake approximately 2 miles northwest of the SPA. The stock ponds in the SPA are potential aquatic and breeding habitat for western pond turtle. However, the ponds lack basking sites, are not hydrologically connected to a larger, moving water body, and the banks are regularly treaded upon and grazed by horses and cattle. Nonetheless, given the presence of potentially suitable habitat and a known occurrence of western pond turtle within 5 miles of the SPA, this species could be present in the SPA.

California tiger salamander is Federally listed as threatened. California tiger salamander use vernal pools and other seasonal ponds for reproduction and seemingly suitable habitat of this type is present in the SPA. However, the nearest known CNDDB occurrence of California tiger salamander is approximately 11 miles southeast of the SPA along a tributary of Laguna Creek located 0.5 mile east of the intersection of Carbondale and Meiss Roads. Furthermore, the USFWS does not consider Sacramento County north of the Cosumnes River to be within the species' range because California tiger salamander has not been found in suitable habitat in this area despite extensive surveys (69 Federal Register 47212, August 4, 2004). Therefore, this species is not expected to occur in the SPA.

Western spadefoot is a California species of concern. To complete its life cycle, it needs appropriate aquatic habitats as well as adjacent upland habitats. A nonspecific CNDDB occurrence of western spadefoot encompasses the entire SPA (CNDDB 2010) and this species was identified in a vernal pool at the eastern edge of the Shalako property in 1993 (Sugnet and Associates 1993). Given the presence of suitable habitat and past documentation of western spadefoot presence on the SPA and in the immediate project vicinity, this species is assumed to be present in the SPA.

Swainson's Hawk and Other Raptors. Swainson's hawk is state-listed as threatened. Historically, Swainson's hawks nested throughout lowland California. As many as 17,000 Swainson's hawk pairs may have nested in California at one time (Bloom 1980). Currently, there are 700–1,000 breeding pairs in California, of which 600–900 are in the Central Valley (Estep 2003, Swainson's Hawk Technical Advisory Committee [SHTAC] 2000). Swainson's hawks are typically found in California only during the breeding season (March through September) and winter in Mexico and South America, although a small number of individuals have been wintering in the San Francisco Bay-Delta area for several years (City of Sacramento et al. 2003). The Central Valley population migrates only as far south as Central Mexico. Swainson's hawks begin to arrive in the Central Valley in March. Nesting territories are usually established by April, with incubation and rearing of young taking place through June (Estep 1989).

Swainson's hawks are most commonly found in grasslands, low shrublands, and agricultural habitats that include large trees for nesting. They nest in riparian woodlands, roadside trees, trees along field borders, and isolated trees. Corridors of remnant riparian forest along drainages contain the majority of known nests in the Central Valley (England et al. 1997; Estep 1984; Schlorff and Bloom 1984). Nesting pairs frequently return to the same nest site for multiple years and decades.

Prey abundance and accessibility are the most important features determining the suitability of Swainson's hawk foraging habitat. In addition, agricultural operations (e.g., mowing, flood irrigation) have a substantial influence on the accessibility of prey and thus create important foraging opportunities for Swainson's hawk. Crops that are tall and dense enough to preclude the capture of prey do not provide suitable habitat except around field margins, but prey animals in these habitats are accessible during and soon after harvest. Swainson's hawks feed primarily on small rodents, but also consume insects and birds. Although the most important foraging habitat for Swainson's hawks lies within a 1-mile radius of each nest (City of Sacramento et. al 2003), Swainson's hawks have been recorded foraging up to 18.6 miles from nest sites (Estep 1989). Any habitat within the foraging distance may provide food at some time in the breeding season that is necessary for reproductive success.

The SPA provides suitable nesting and foraging habitat for Swainson's hawk. There are 12 CNDDB recorded occurrences within 5 miles southeast of the SPA, the closest of which is located approximately 2 miles southwest of the SPA along Meiss Road. An active Swainson's hawk was also observed by AECOM biologists on the adjacent Arboretum project site near Blodgett Reservoir in June 2007 (EDAW [now AECOM] 2007). Although this species was not observed in the SPA during field visits, Swainson's hawk could occur because there is suitable nesting and foraging habitat within the SPA.

Western burrowing owl is known to nest in the SPA. Burrowing owl is a California species of special concern. Burrowing owls and their nests are also protected under Section 3503.5 of the California Fish and Game Code. Burrowing owls typically inhabit grasslands and other open habitats with low-lying vegetation. They are also known to nest and forage in idle agricultural fields, ruderal fields, and the edges of cultivated fields, although these areas provide lower-quality habitat than grasslands. Burrow availability is an essential component of suitable habitat. Burrowing owls are capable of digging their own burrows in areas with soft soil, but they generally prefer to adopt those excavated by other animals, typically ground squirrels. In areas where burrows are scarce, they can use pipes, culverts, debris piles, and other artificial features.

AECOM wildlife biologists identified three western burrowing owls in the SPA during the November 10, 2005 field visit conducted in support of this analysis. Signs of burrowing owls (i.e., presence of excrement (whitewash) and prey pellets) were observed near burrows in the central southwest portion of the SPA, along the banks of Kite Creek, and within an abandoned well. In addition, there are three CNDDB occurrences within 1 mile of the SPA for western burrowing owl (CNDDB 2010).

Northern harrier, Cooper's hawk, white-tailed kite, ferruginous hawk, red-tailed hawk, and great horned owl are raptor species that have been observed in the SPA and could nest in the SPA. Foothill Associates observed a northern harrier and a pair of Cooper's hawks in the SPA during a field survey in 2004 (Foothill Associates 2004). White-tailed kite, a fully protected species, is known to forage in the SPA and nest in the project vicinity. There is a 1990 CNDDB record of a breeding pair of white-tailed kites at the north side of Blodgett Reservoir, south of Kiefer Boulevard (CNDDB 2010), and this species was observed foraging near Blodgett Reservoir by AECOM biologists in 2007. Sugnet & Associates observed white-tailed kites foraging in the SPA in 1993 and Foothill Associates (Foothill Associates 2004) also observed a white-tailed kite foraging in the southern section of the SPA south of Kiefer Boulevard during the 2004 field visit. Other raptors that could nest in the SPA include American kestrel, red-tailed hawk, red-shouldered hawk, and barn owl. A number of large nests were observed in the SPA by Foothill Associates in 2004 and by AECOM biologists in 2007, but none of these nests were confirmed to be active. All raptors and their nests are protected under Section 3503.3 of the California Fish and Game Code.

Other Nesting Birds. Grasslands in the SPA provide suitable year-round habitat for loggerhead shrike and potential breeding habitat for grasshopper sparrow. Sugnet & Associates observed a loggerhead shrike foraging in the SPA in 1993 (Sugnet & Associates 2003), and two loggerhead shrike nests were observed by AECOM biologists on the adjacent Arboretum project site in 2007 (EDAW [now AECOM] 2007). Grasshopper sparrow has not been documented on the SPA or immediate vicinity, but it is known from the region and could nest on site.

American Badger. American badger, a California species of concern, prefers open grassland habitats with friable soils. An occurrence less than 1 mile north of the SPA was identified in the CNDDB (Exhibit 3.3-2). Since there is suitable habitat for American badger and known occurrences within the vicinity of the SPA, this species has the potential to occur in the SPA.

Sensitive Habitats

Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, Section 404 of the CWA, and the State's Porter Cologne Act, as discussed under "Regulatory Framework" below. Sensitive natural habitat may be of special concern to these agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species. Many of these communities are tracked in DFG's Natural Diversity Database, a statewide inventory of the locations and conditions of the state's rarest plant and animal taxa and vegetation types. Habitat types on the SPA that would be considered sensitive by regulatory agencies consist of vernal pools, depressional seasonal wetlands, and riverine seasonal wetlands.

Wetlands and Other Waters of the United States

Wetland delineations were conducted on the SPA by Davis^2 Consulting Earth Scientists in 2000 and 2001, and by Foothill Associates and ECORP in 2004 and 2005 (Foothill Associates 2005a and 2005b, ECORP 2007a, 2007b, and 2007c). These wetland delineations were verified by USACE in 2007. Verified wetland delineation maps identify a total of 42.48 acres of jurisdictional wetlands and other waters of the U.S. in the SPA.

Wetlands in the SPA that are subject to USACE jurisdiction consist of 26.29 acres of vernal pools, 6.35 acres of swales, and 2.54 acres of seasonal wetlands. Other waters of the U.S. identified in the SPA consist of 2.06 acres of ponds, 0.90 acre of ephemeral drainage, 0.98 acre of intermittent drainage, and 3.34 acres of streams, including a tributary of Laguna Creek. This tributary is identified as Sun Creek on local road signs, but is referred to as Kite Creek in County drainage plans and in baseline hydrology reports. For consistency with the hydrology studies, the tributary is referred to as Kite Creek throughout this DEIR/DEIS. The locations of wetlands and other waters of the U.S., as mapped by Davis^2, Foothill Associates, and ECORP, have been included on Exhibit 3.3-1. A large portion of the vernal pools and seasonal wetland swales and most of the drainage tributary to Laguna Creek is concentrated within a corridor traversing the central portion of the SPA, where approximately 204 acres of habitat are designated for preservation as part of the Proposed Project Alternative. Wetlands and other waters of the United States that would be retained within the on-site wetland preserve consist of 12.716 acres of vernal pools, 1.943 acres of swales, 1.524 acres of seasonal wetlands, 0.808 acre of intermittent drainage, and 2.507 acres of streams. Additional acreage would be preserved within the "Wetland Preserve" land use classification under the No USACE Permit, Biological Impact Minimization, and Conceptual Strategy Alternatives, which would provide 607,411, and 310 acres of wetland preserve, respectively. A lesser amount of habitat acreage would be preserved under the Increased Development Alternative, which would provide approximately 97 acres of wetland preserve. The areas designated as Wetland Preserve under each alternative are depicted on Exhibits 3.3-3 through 3.3-7.

3.3.2 REGULATORY FRAMEWORK

Biological resources in California are protected and/or regulated by a variety of Federal and state laws and policies. In addition, in many parts of California, there are local or regional habitat and species conservation planning efforts in which a project applicant may participate. Key regulatory and conservation planning issues applicable to the project and alternatives under consideration are discussed below.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Section 404 of the Clean Water Act

Section 404 of the CWA establishes a requirement for a project applicant to obtain a permit before engaging in any activity that involves any discharge of dredged or fill material into "waters of the U.S.," including wetlands. Fill material is material placed in waters of the U.S. where the material has the effect of replacing any portion of a water of the U.S. with dry land, or changing the bottom elevation of any portion of a water of the U.S. Waters of the U.S. include traditional navigable waters of the U.S. (TNWs) and adjacent wetlands, relatively permanent waters (RPWs) (i.e., waters that flow continuously at least on a seasonal basis, typically at least 3 months of the year) that are tributary to TNWs, and wetlands with a continuous surface connection to RPWs, and non-relatively permanent tributaries of TNWs and adjacent wetlands if they have a significant nexus to a TNW. Non-RPWs and adjacent wetlands are determined to have a significant nexus to a TNW if they significantly affect the chemical, physical, or biological integrity of a downstream TNW. Wetlands are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Jurisdictional wetlands must meet three wetland delineation criteria: hydrophytic vegetation, hydric soil types, and wetland hydrology. Wetlands that meet the delineation criteria may be jurisdictional under Section 404 of CWA pending USACE and the U.S. Environmental Protection Agency (EPA) review.

In 2008, the USACE and EPA issued regulations governing compensatory mitigation for activities authorized by permits issued by the USACE. The rule establishes a preference for the use of mitigation banks because they provide established wetland habitats that have already met success criteria thereby reducing some of the risks and uncertainties associated with compensatory mitigation involving creation of new wetlands that cannot yet demonstrate functionality at the time of project implementation.

Federal Endangered Species Act

The USFWS and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) have authority over projects that may result in take of a species listed as threatened or endangered under the ESA (i.e., a Federally listed species). In general, persons subject to ESA (including private parties) are prohibited from "taking" endangered or threatened fish and wildlife species on private property, and from "taking" endangered or threatened plants in areas under Federal jurisdiction or in violation of state law. Under the ESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has also interpreted the definition of "harm" to include significant habitat modification that could result in take. If a project would result in take of a Federally listed species, either an incidental take permit, under Section 10(a) of the Federal ESA, or a Federal interagency consultation, under Section 7 of the Federal ESA, is required prior to the take. Such a permit typically requires various types of mitigation to compensate for or to minimize the take.

Section 401 Water Quality Certification

Under Section 401 of the CWA, an applicant for a Section 404 permit must obtain a certificate from the appropriate state agency stating that the intended dredging or filling activity is consistent with the state's water quality standards and criteria. In California, the authority to grant water quality certification is delegated by the State Water Resources Control Board to the nine Regional Water Quality Control Boards (RWQCBs).

TOTAL AVOIDANCE & IMPACT

	Avoided	Direct Impacts		Wetlands within 250' of Development[2]		Existing Acreage
		Onsite	Offsite[3]	Onsite	Offsite[3]	
Vernal Pool	12.716	13.573	0.930	9.952	7.515	27.219[1]
Seasonal Wetland	1.524	1.021	0.093	1.222	3.136	2.638
Swale	1.943	4.406	0.115	1.677	2.362	6.464
Ephemeral Drainage	0.000	0.903	0.000	0.000	0.000	0.903
Intermittent Drainage	0.808	0.174	0.000	0.543	0.000	0.982
Pond	0.000	2.056	0.000	0.000	0.649	2.056
Stream	2.507	0.831	0.078	1.689	1.633	3.416
Isolated Vernal Pool	0.000	0.012	0.000	0.000	0.000	0.012
Total	*19.498*	*22.976*	*1.216*	*15.083*	15.295	43.690

NOTES

Gross project acreage: +/- 1265 ac.

Gross preserve acreage: +/- 198 ac.

Base data source: Wade Associates.

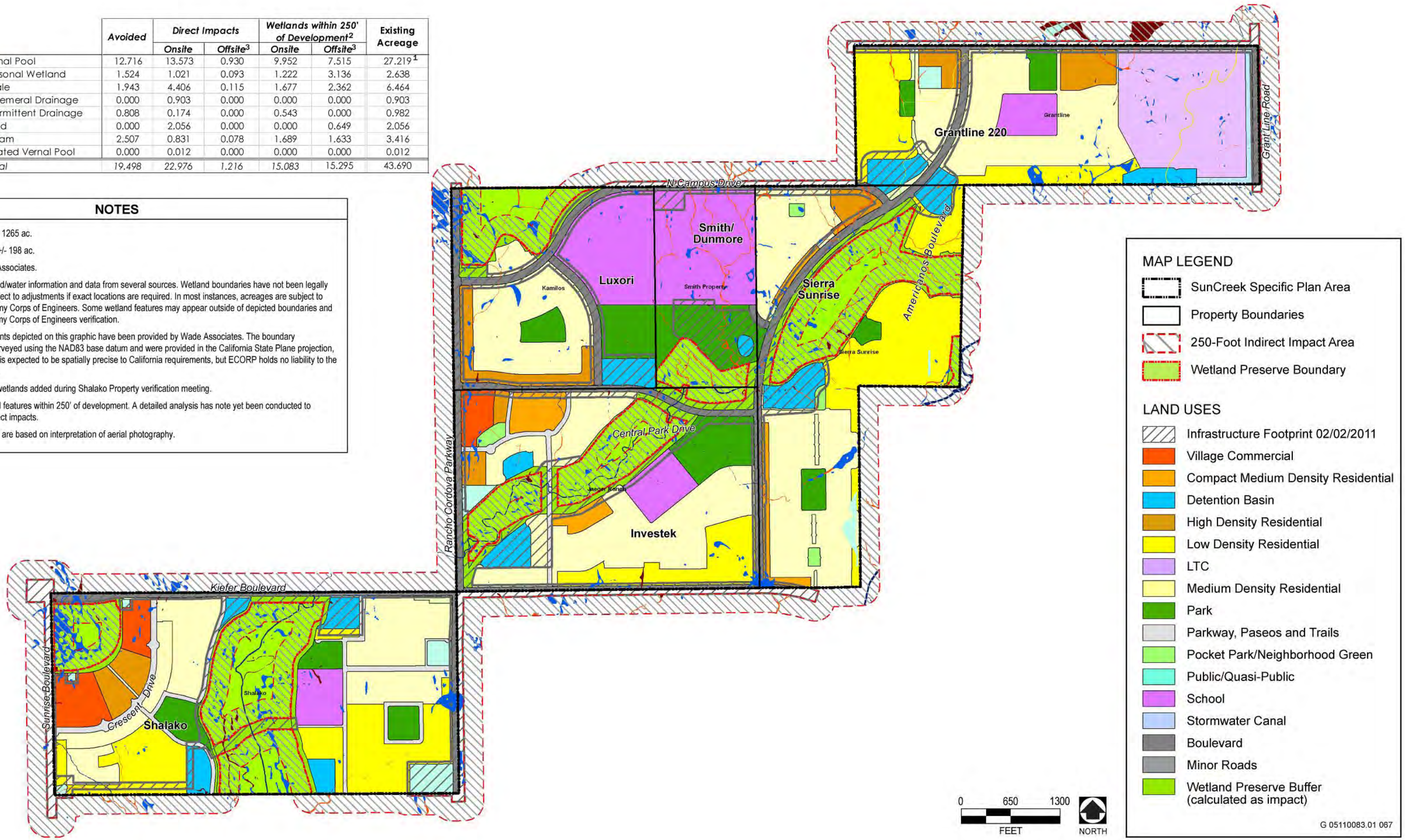
This exhibit depicts wetland/water information and data from several sources. Wetland boundaries have not been legally surveyed and may be subject to adjustments if exact locations are required. In most instances, acreages are subject to verification by the U.S. Army Corps of Engineers. Some wetland features may appear outside of depicted boundaries and were left as is pending Army Corps of Engineers verification.

The project boundary extents depicted on this graphic have been provided by Wade Associates. The boundary coordinates have been surveyed using the NAD83 base datum and were provided in the California State Plane projection, Grid Units. This boundary is expected to be spatially precise to California requirements, but ECORP holds no liability to the accuracy of the boundary.

[1] Includes 0.771 acres of wetlands added during Shalako Property verification meeting.

[2] Acreage is for all wetland features within 250' of development. A detailed analysis has note yet been conducted to determine potential indirect impacts.

[3] Offsite wetland acreages are based on interpretation of aerial photography.



Source: ECORP 2012, Adapted by AECOM in 2012

Proposed Project Alternative – Impacts on Wetlands and Other Waters **Exhibit 3.3-3**

TOTAL AVOIDANCE & IMPACT

	Avoided	Direct Impacts [4]		Wetlands within 250' of Development [2]		Existing Acreage
		Onsite	Offsite [3]	Onsite	Offsite [3]	
Vernal Pool	27.237	0.000	0.000	15.585	6.948	27.237 [1]
Seasonal Wetland	2.643	0.000	0.000	1.671	3.047	2.643
Swale	6.392	0.000	0.000	3.265	1.663	6.392
Ephemeral Drainage	0.904	0.000	0.000	0.846	0.000	0.904
Intermittent Drainage	0.984	0.000	0.000	0.173	0.047	0.984
Pond	2.056	0.000	0.000	2.015	0.632	2.056
Stream	3.421	0.000	0.000	2.054	0.949	3.421
Isolated Vernal Pool	0.012	0.000	0.000	0.012	0.000	0.012
Total	43.649	0.000	0.000	25.621	13.286	43.649

Note 4: Areas where clear spans & bridges would be necessary for roadways and jack & bore installation techniques would be necessary for underground utilities to avoid all impacts to wetlands.

NOTES

Gross project acreage: +/- 1265 ac.

Gross preserve acreage: +/- 601 ac.

Base data source: Wade Associates.

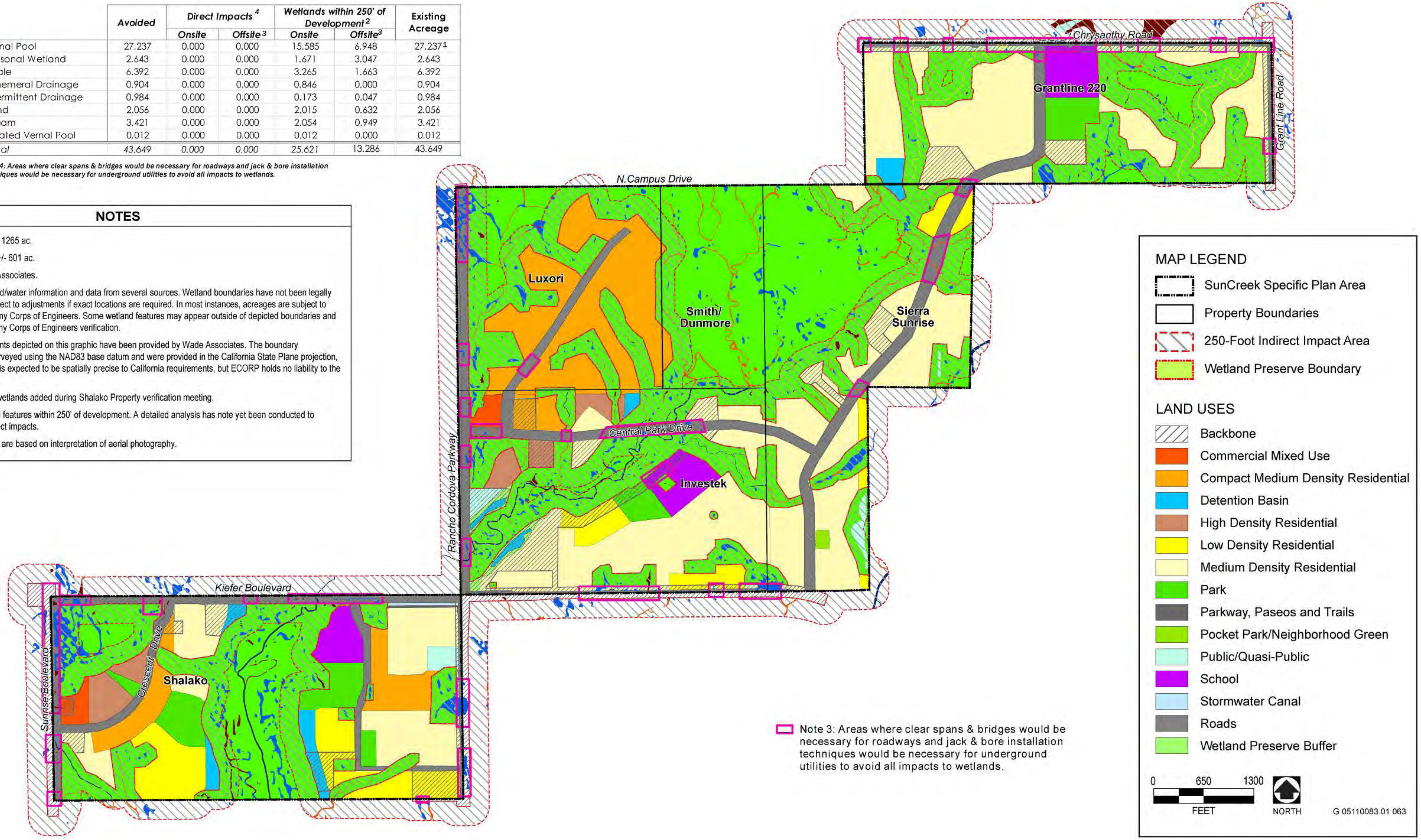
This exhibit depicts wetland/water information and data from several sources. Wetland boundaries have not been legally surveyed and may be subject to adjustments if exact locations are required. In most instances, acreages are subject to verification by the U.S. Army Corps of Engineers. Some wetland features may appear outside of depicted boundaries and were left as is pending Army Corps of Engineers verification.

The project boundary extents depicted on this graphic have been provided by Wade Associates. The boundary coordinates have been surveyed using the NAD83 base datum and were provided in the California State Plane projection, Grid Units. This boundary is expected to be spatially precise to California requirements, but ECORP holds no liability to the accuracy of the boundary.

[1] Includes 0.771 acres of wetlands added during Shalako Property verification meeting.

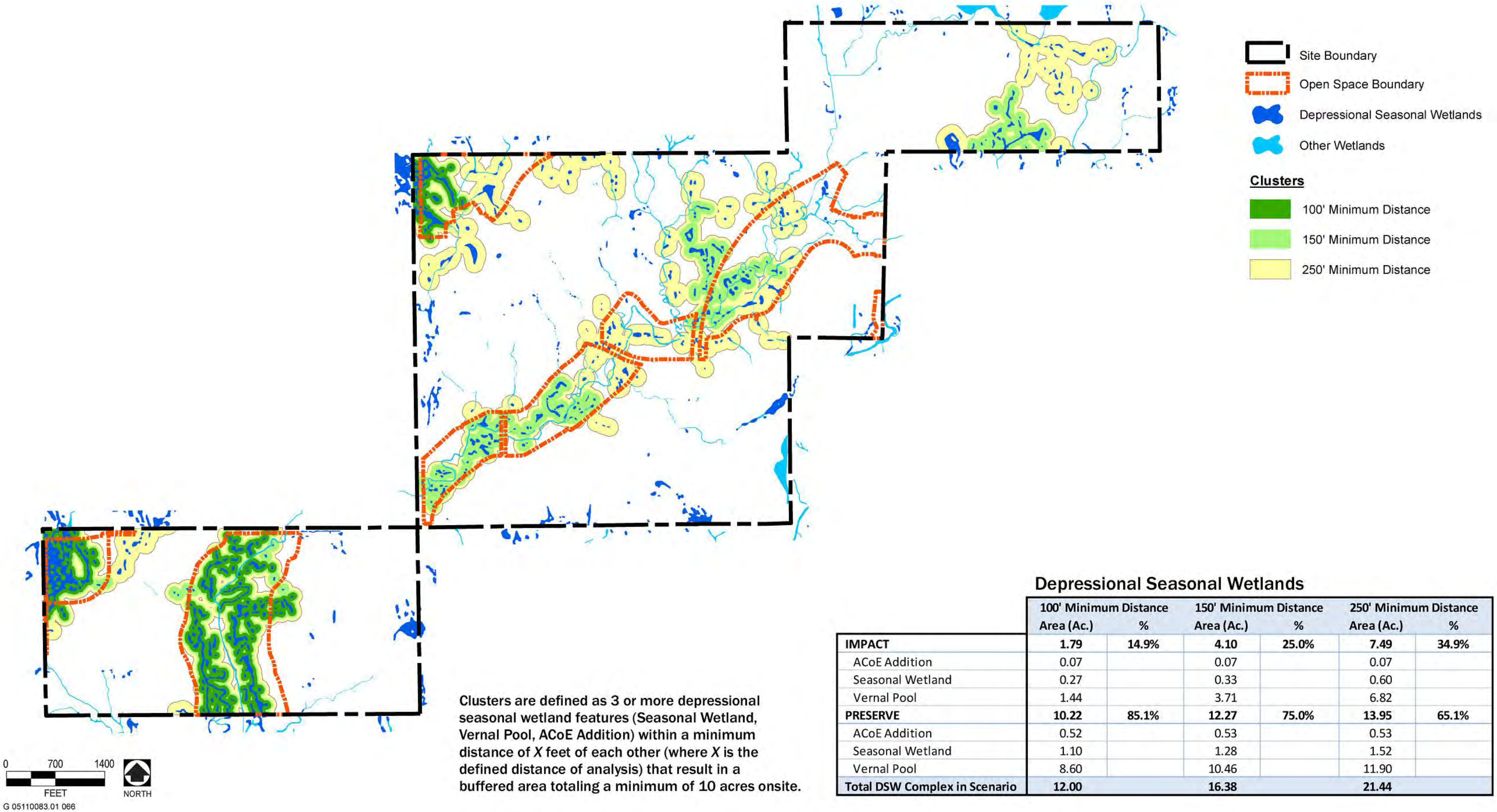
[2] Acreage is for all wetland features within 250' of development. A detailed analysis has note yet been conducted to determine potential indirect impacts.

[3] Offsite wetland acreages are based on interpretation of aerial photography.



Source: ECORP 2011, Adapted by AECOM in 2011

No USACE Permit Alternative – Impacts on Wetlands and Other Waters **Exhibit 3.3-4**



Clusters are defined as 3 or more depressional seasonal wetland features (Seasonal Wetland, Vernal Pool, ACoE Addition) within a minimum distance of *X* feet of each other (where *X* is the defined distance of analysis) that result in a buffered area totaling a minimum of 10 acres onsite.

Depressional Seasonal Wetlands

	100' Minimum Distance		150' Minimum Distance		250' Minimum Distance	
	Area (Ac.)	%	Area (Ac.)	%	Area (Ac.)	%
IMPACT	**1.79**	**14.9%**	**4.10**	**25.0%**	**7.49**	**34.9%**
ACoE Addition	0.07		0.07		0.07	
Seasonal Wetland	0.27		0.33		0.60	
Vernal Pool	1.44		3.71		6.82	
PRESERVE	**10.22**	**85.1%**	**12.27**	**75.0%**	**13.95**	**65.1%**
ACoE Addition	0.52		0.53		0.53	
Seasonal Wetland	1.10		1.28		1.52	
Vernal Pool	8.60		10.46		11.90	
Total DSW Complex in Scenario	**12.00**		**16.38**		**21.44**	

Source: ECORP 2011

Microwatershed Cluster Analysis **Exhibit 3.3-5**

TOTAL AVOIDANCE & IMPACT

	Avoided	Direct Impacts		Wetlands within 250' of Development[2]		Existing Acreage
		Onsite	Offsite[3]	Onsite	Offsite[3]	
Vernal Pool	18.076	8.221	0.946	12.082	7.212	27.243[1]
Seasonal Wetland	1.732	0.812	0.109	1.178	3.086	2.653
Swale	4.580	1.772	0.044	3.142	2.050	6.396
Ephemeral Drainage	0.812	0.092	0.000	0.812	0.000	0.904
Intermittent Drainage	0.981	0.004	0.000	0.390	0.000	0.985
Pond	0.000	2.056	0.000	0.000	0.641	2.056
Stream	2.764	0.573	0.087	1.424	1.634	3.424
Isolated Vernal Pool	0.000	0.012	0.000	0.000	0.000	0.012
Total	*28.945*	*13.542*	*1.186*	*19.028*	14.623	43.673

NOTES

Gross project acreage: +/- 1265 ac.

Gross preserve acreage: +/- 399 ac.

Base data source: Wade Associates.

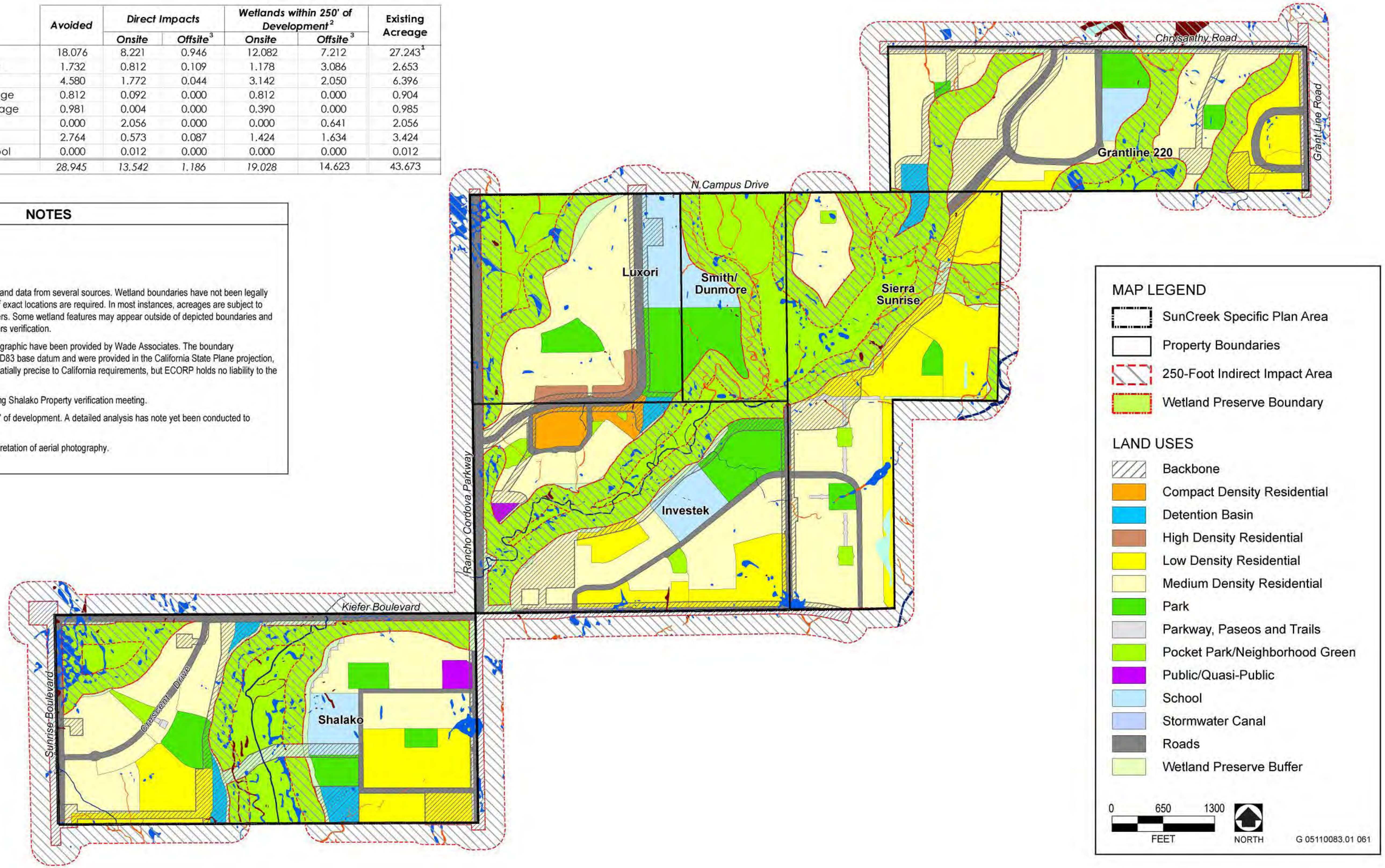
This exhibit depicts wetland/water information and data from several sources. Wetland boundaries have not been legally surveyed and may be subject to adjustments if exact locations are required. In most instances, acreages are subject to verification by the U.S. Army Corps of Engineers. Some wetland features may appear outside of depicted boundaries and were left as is pending Army Corps of Engineers verification.

The project boundary extents depicted on this graphic have been provided by Wade Associates. The boundary coordinates have been surveyed using the NAD83 base datum and were provided in the California State Plane projection, Grid Units. This boundary is expected to be spatially precise to California requirements, but ECORP holds no liability to the accuracy of the boundary.

[1] Includes 0.771 acres of wetlands added during Shalako Property verification meeting.

[2] Acreage is for all wetland features within 250' of development. A detailed analysis has note yet been conducted to determine potential indirect impacts.

[3] Offsite wetland acreages are based on interpretation of aerial photography.



Source: ECORP 2011, Adapted by AECOM in 2011

Biological Impact Minimization Alternative – Impacts on Wetlands and Other Waters **Exhibit 3.3-6**

TOTAL AVOIDANCE & IMPACT

	Avoided	Direct Impacts		Wetlands within 250' of Development [2]		Existing Acreage
		Onsite	Offsite	Onsite[3]	Offsite [3]	
Vernal Pool	13.349	12.941	1.039	7.902	7.553	27.329[1]
Seasonal Wetland	1.549	0.995	0.106	0.983	3.075	2.650
Swale	2.722	3.629	0.145	1.185	2.333	6.496
Ephemeral Drainage	0.000	0.903	0.000	0.000	0.000	0.903
Intermittent Drainage	0.869	0.112	0.002	0.519	0.000	0.983
Pond	0.000	2.056	0.000	0.000	0.628	2.056
Stream	2.790	0.547	0.088	0.919	1.629	3.425
Isolated Vernal Pool	0.000	0.012	0.000	0.000	0.000	0.012
Total	*21.279*	*21.195*	*1.380*	*11.508*	15.218	43.854

NOTES

Gross project acreage: +/- 1265 ac.

Gross preserve acreage: +/- 204 ac.

Base data source: Wade Associates.

This exhibit depicts wetland/water information and data from several sources. Wetland boundaries have not been legally surveyed and may be subject to adjustments if exact locations are required. In most instances, acreages are subject to verification by the U.S. Army Corps of Engineers. Some wetland features may appear outside of depicted boundaries and were left as is pending Army Corps of Engineers verification.

The project boundary extents depicted on this graphic have been provided by Wade Associates. The boundary coordinates have been surveyed using the NAD83 base datum and were provided in the California State Plane projection, Grid Units. This boundary is expected to be spatially precise to California requirements, but ECORP holds no liability to the accuracy of the boundary.

[1] Includes 0.771 acres of wetlands added during Shalako property verification meeting.

[2] Acreage is for all wetland features within 250' of development. A detailed analysis has not yet been conducted to determine potential indirect impacts.

[3] Offsite wetland acreages are based on interpretation of aerial photography.

Source: ECORP 2011, Adapted by AECOM in 2011

Conceptual Strategy Alternative – Impacts on Wetlands and Other Waters **Exhibit 3.3-7**

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, provides for international migratory bird protection and authorizes the Secretary of the Interior to regulate the taking of migratory birds. MBTA provides that it shall be unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird. The current list of species protected by MBTA can be found in Title 50, Code of Federal Regulations (CFR) Section 10.13. The list includes nearly all birds native to the United States.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Endangered Species Act

In accordance with the CESA and Section 2081 of the California Fish and Game Code, a permit from DFG is required for projects that could result in the take of a wildlife species state-listed as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include "harm" or "harass," as the Federal act does.

Section 1602 of the California Fish and Game Code

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by DFG, or use any material from the streambeds, without first notifying DFG of such activity and obtaining a final agreement authorizing such activity. "Stream" is defined as a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports fish or other aquatic life. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG Streambed Alteration Agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Porter Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act requires that each of the nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCB's jurisdiction includes Federally protected waters as well as areas that meet the definition of "waters of the state." Waters of the state is defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCB has the discretion to take jurisdiction over areas not Federally protected under Section 401 provided they meet the definition of waters of the state. Mitigation requiring no net loss of wetlands functions and values of waters of the state is typically required by the RWQCB.

California Fish and Game Code Section 3503.5 (Protection of Raptors)

Section 3503.5 of the California Fish and Game Code states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations include destruction of active raptor nests as a result of tree removal and failure of nesting attempts, resulting in loss of eggs and/or young, because of disturbance of nesting pairs by nearby human activity.

Regional and Local Plans, Policies, Regulations, and Ordinances

Rancho Cordova General Plan

Goals and policies from the *City of Rancho Cordova General Plan* (City General Plan 2006) relating to biological resources that are applicable to the Proposed Project and alternatives under consideration are listed in Appendix K.

Proposed South Sacramento Habitat Conservation Plan

The SPA is located within the proposed South Sacramento County Habitat Conservation Plan (SSCHCP) area. The SSCHCP is intended to provide a regional approach to issues related to urban development, habitat conservation, agricultural production, and open-space planning. The SSCHCP would provide strategies to conserve habitat for nine special-status plants and 42 special-status wildlife species. The conservation strategy has four components: conservation (habitat acquisition), restoration, enhancement, and a limited amount of avoidance and minimization. If adopted, it would serve as a multispecies, multihabitat conservation plan addressing the biological impacts of future urban development within the Urban Services Boundary (USB) in the southern portion of the County. The emphasis of the SSCHCP is to secure large, interconnected blocks of habitat that focus on protecting intact subwatersheds while minimizing edge effects and maximizing heterogeneity. Habitat losses within the USB would be offset primarily through the establishment of large preserves outside the USB, but three core preserves would be established within the USB and two satellite preserves would be established within the USB in the vicinity of the SPA. Habitat mitigation for impacts resulting from a particular project must take place on the same geological formation as the affected area. As currently conceived, land developers that convert habitat within the USB would pay a defined per-acre fee to mitigate impacts. These fees would be used to protect, restore, maintain, and monitor habitat. The process for developing the SSCHCP was initiated in 1992. The SSCHCP is currently undergoing environmental review and the best-case estimate for completion and implementation is late 2011-early 2012 (McCormick, pers. comm., 2010). At this time, the SSCHCP is in draft form and still being developed. Since the SSCHCP is still being drafted, it would be premature to attempt to analyze the project's consistency with the SSCHCP. Also, since it is not an adopted plan, the project's consistency is not required to be analyzed under CEQA or NEPA. Therefore, an analysis of the project's consistency with the SSCHCP is not included in this EIR/EIS.

When a final draft SSHCP is adopted, projects applying to the City of Rancho Cordova, a participating entity in the SSHCP, will be evaluated for compliance with the SSHCP. Projects that do not comply with the SSHCP cannot be permitted under the plan. If a project is in compliance with requirements of the SSHCP, the project can obtain take authorization through participation in the SSHCP and impacts on biological resources resulting from project implementation can be mitigated by payment of appropriate fees to the plan participant, which in this case would be the City of Rancho Cordova.

Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon

The Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005) was released by USFWS on December 15, 2005. This plan focuses on 33 species of plants and animals that occur exclusively or primarily within vernal pool ecosystems, including the Federally listed vernal pool fairy shrimp and tadpole shrimp. The plan outlines recovery priorities and provides goals, objectives, strategies, and criteria for recovery. One of the overall objectives of the recovery plan is to promote natural ecosystem processes and functions by protecting and conserving intact vernal pools and vernal pool complexes. Habitat protection under the recovery plan includes the protection of the topographic, geographic, and edaphic features that support hydrologically interconnected systems of vernal pools, swales, and other seasonal wetlands within an upland matrix that together form hydrologically and ecologically functional vernal pool complexes. The project site is located within the Mather Core Area under the Recovery Plan. The preservation goal established by USFWS for the vernal pool habitat in this Core Area is 85%–95%. However, this preservation goal was established for the entire area, not necessarily on a project-by-project basis. In addition, the general mapping for areas to be preserved under the

Recovery Plan is difficult to accurately apply on a project-by-project basis. The Recovery Plan is not regulatory in nature; however, it may be taken into consideration when analyzing potential impacts on vernal pools and associated biota although consistency with the Plan is not required by law. It is used by the USFWS to determine recommendations and requirements during endangered species consultation for vernal pool dependent species. For these reasons, an analysis of the project's consistency with the Recovery Plan is not required under CEQA or NEPA, and, therefore, is not included in this EIR/EIS.

3.3.3 Environmental Consequences and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or alternatives under consideration were determined to result in a significant impact related to biological resources if they would do any of the following:

- have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG and USFWS;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by DFG and USFWS;
- have a substantial adverse effect on Federally protected waters of the U.S., including wetlands, as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption or other means;
- interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan; or
- substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

Analysis Methodology

This analysis of impacts on biological resources resulting from project implementation is based on data collected during reconnaissance-level field surveys conducted by AECOM biologists on November 10, 2005 and June 7, 2007; extensive review of existing documentation that addresses biological resources and previous surveys conducted on or near the SPA, including CNDDB and CNPS records, the proposed SSHCP; and surveys conducted by Foothill Associates and ECORP, as described previously. Additional information was obtained from Geographic Information System (GIS) analysis and data gathered from the project applicants' biological resources consultants.

The Proposed Project Alternative includes the creation of a 204-acre wetland preserve network primarily concentrated within a corridor traversing the central portion of the SPA from northeast to southwest along Kite

Creek (Exhibit 3.3-3). This proposed 204-acre preserve would be preserved and maintained in perpetuity for wetland conservation and wildlife habitat through deed restrictions and conservation easements. An additional 45-acre buffer area with passive recreational uses (e.g., bike paths) would be provided around the wetland preserve areas. The Proposed Project Alternative also includes the creation of 5 acres of stormwater canal and 47 acres of detention basins, much of which would be constructed adjacent to the wetland preserve. Five additional alternatives are evaluated at an equal level of detail and compared to the Proposed Project Alternative. Each alternative includes a wetland preserve network concentrated primarily along the Kite Creek corridor, but the size and shape of the wetland preserve network varies with each alternative. It is assumed that full project buildout, under each alternative, would result in loss of all existing habitat outside of the wetland preserve network for that alternative.

It is assumed that mitigation recommended herein would occur as defined in the Section 404 permit, if issued. Compensatory mitigation would be phased with project implementation as required by the Section 404 permit for the project, if issued. The timing of compensatory mitigation is expected to be established to offset temporal losses.

To provide a comprehensive approach to the impact analysis and provide that impacts to resources of concern to more than one agency are discussed together, the impact analysis has been structured to include three broad impact categories: impacts to sensitive habitats, impacts to special-status wildlife, and impacts to special-status plants. The evaluation of impacts to sensitive habitats incorporates both quantitative and qualitative aspects. Impacts were evaluated by calculating the acreage of each sensitive habitat by land use designation. It is assumed that development in areas that would require grading would result in the elimination of all wetland and other sensitive habitats within that land use designation. Therefore, the only land use designation that would be expected to afford some level of protection for wetland and other sensitive habitats is the proposed "Wetland Preserve" (see Exhibit 3.3-3). Sensitive habitats that would be affected by implementation of the Proposed Project, Conceptual Strategy, and Increased Development Alternatives consist of vernal pool, seasonal wetland, swale, ephemeral drainage, intermittent drainage, pond, stream, and riparian scrub. Implementation of the Biological Impact Minimization Alternative would also affect these sensitive habitats but to a lesser degree than the Proposed Project, Conceptual Strategy, and Increased Development Alternatives as discussed below. The No USACE Permit Alternative and No Project Alternative would not directly affect sensitive habitats on the SPA.

The project includes a proposal to install two on-site groundwater wells and an on-site groundwater treatment plant. Hydrologic modeling determined that installation and operation of the groundwater wells and groundwater treatment plant would not have a significant effect on water levels in the Cosumnes River and, consequently, in the Delta. Thus, the project would not adversely affect delta smelt. The potential impact to water levels in the Cosumnes River from groundwater drawdown as a result of installing the two on-site wells is evaluated in Section 3.9, "Hydrology and Water Quality."

ISSUES NOT DISCUSSED FURTHER IN THIS EIR/EIS

Conflict with any Local Policies or Ordinances Protecting Biological Resources—The project has been designed to be consistent with City of Rancho Cordova General Plan policies and ordinances protecting biological resources. In general, the No UASCE Permit and Biological Impact Minimization Alternatives protect the most biological resources; the Proposed Project Alternative and the Conceptual Strategy Alternatives protect nearly the same amount of biological resources, and the Increased Development Alternative protects the least amount biological resources. The only inconsistency with City General Plan policies would occur under the Increased Development Alternative as discussed below in Impact 3.3-5, related to a lack of connectivity with wildlife corridors. Therefore, this issue is not evaluated as a separate impact in this EIR/EIS.

Substantial Adverse Effects on Special-status Plant Species—Special-status plant surveys conducted according to established protocols and over multiple years, the last in 2008, have not identified any special-status plants in the SPA. Therefore, special-status plants are considered absent from the SPA and therefore this issue is not evaluated further in this EIR/EIS.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE Permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.3-1	**Loss and Degradation of Jurisdictional Wetlands and Other Waters of the U.S.** *Implementing the project would result in the placement of fill material into jurisdictional waters of the U.S., including wetlands subject to USACE jurisdiction under the Federal Clean Water Act. Wetlands and other waters of the U.S. that would be affected by project implementation consist of vernal pool, seasonal wetland, swale, ephemeral drainage, intermittent drainage, pond, and stream.*

NP

Under the No Project Alternative no development would occur, thereby resulting in no project-related ground-disturbing activities that would affect USACE jurisdictional wetlands and other waters of the U.S. or other wetland habitats protected by state and local regulations. Therefore, **no direct** or **indirect impacts** would occur under the No Project Alternative. ***[Lesser]***

NCP

The No USACE Permit Alternative would not result in fill of wetlands or other waters subject to USACE jurisdiction under the CWA. No development would occur within 50 feet of wetland features and free spanning bridges would be constructed wherever roadways cross waters to avoid impacts on these waters. This alternative would designate an additional 403 acres of Wetland Preserve compared to the Proposed Project Alternative (a total of 607 acres). However, mixed-use development would still be constructed adjacent to aquatic resources resulting in topographic modifications, creation of impervious surfaces, urban runoff, erosion, and siltation; intrusion of humans and domestic animals; and introduction of invasive plant species that could result in habitat degradation.

Relative to the other project alternatives, excluding the No Project Alternative, the No USACE Permit Alternative would preserve a larger proportion (100% of wetted acreage) of the wetland and drainage complexes within the SPA, provide a larger buffer to minimize impacts of adjacent land uses, and preserve a greater proportion of upland habitat to support species that use both wetland and upland habitats and provide ecological services to vernal pool species. This alternative would also preserve the 0.01 acre of isolated vernal pool considered waters of the state, although this pool would be subject to indirect effects from development within 250 feet. Table 3.3-3 provides a side-by-side comparison of preserved versus affected acreage of wetlands and other waters of the U.S. for each project alternative. Exhibit 3.3-4 depicts aquatic resources in the SPA relative to the Wetland Preserve areas and impact areas for the No USACE Permit Alternative.

Because this alternative would not result in fill of waters of the U.S., **no direct** impacts would occur. ***[Lesser]***

However, this alternative would still result in changes to site topography and increased impervious surfaces and urban development would still occur within 250 feet of waters of the U.S., potentially resulting in indirect impacts. There are approximately 39 acres of waters of the U.S. within 250 feet of development under the No USACE Permit Alternative compared to approximately 30 acres under the Proposed Project Alternative. Therefore, **indirect significant** impacts would result on a comparable scale to that of the Proposed Project Alternative. ***[Similar]***

Table 3.3-3
Summary of Direct Wetland Impacts and Preservation for each Alternative[1]

Alternative	Acres Existing[2]	Acres of Direct Impact	Acres Preserved	Percent Preserved
NP	42.48	0.00	42.48	100
NCP	43.65	0.00	43.65	100
PP	43.69	24.19	19.50	45
BIM	43.67	14.73	28.94	66
CS	43.86	22.58	21.28	48
ID	44.23	31.86	12.37	28

Note:
1 Acreages have been rounded.
2 Existing acreage of wetlands and other waters differs among the alternatives because each alternative has a different backbone infrastructure footprint outside of the SPA boundary.
Source: ECORP 2011

Mitigation Measure 3.3-1a: Include in Drainage Plans All Wetlands that Remain On-site, Submit Plans to the City and USACE for Review and Approval, and Implement all Measures in Drainage Plans.

To minimize indirect impacts on water quality and wetland hydrology, the project applicants for any particular discretionary development application shall include drainage plans in their improvement plans and shall submit the drainage plans to the City Public Works Department for review and approval. Before approval of these improvement plans, the project applicants for all project phases shall commit to implement all measures in their drainage plans, to avoid and minimize erosion and runoff into Laguna Creek, its tributaries, and all wetlands to remain on-site. Appropriate runoff controls such as berms, storm gates, detention basins, overflow collection areas, filtration systems, and sediment traps shall be implemented to control siltation and the potential discharge of pollutants. See Section 3.9, “Hydrology and Water Quality,” for further discussion of the project’s NPDES permit and associated Stormwater Pollution Prevention Plan, which would also reduce erosion and siltation.

The project shall result in no-net change to peak flows into Laguna Creek and associated tributaries off site or in the wetland preserve areas. The applicant shall establish a baseline of conditions for drainage on site. The baseline flow conditions shall be established for 2-, 5-, 10- and 20-year storm events. These baseline conditions shall be used to develop monitoring standards for the stormwater system in the SPA. The baseline conditions, monitoring standards, and a monitoring program shall be submitted to the City for their approval. The detention basins shall be designed and constructed so that performance standards described in Section 3.9, “Hydrology and Water Quality” are met. The discharge site into Kite Creek and associated tributaries shall be monitored so that preproject conditions are being met. Corrective measures shall be implemented as necessary. The mitigation measures shall be considered satisfied when the monitoring standards are met for 5 consecutive years without undertaking corrective measures.

Implementation: Project applicants for any particular discretionary development application requiring fill of wetlands or other waters of the U.S. or waters of the state.

Timing: Before the approval of grading or improvement plans or any ground-disturbing activities for any project development phase containing wetland features or other waters of the U.S. The wetland mitigation and monitoring plan must be approved before any impact on wetlands can occur. Mitigation shall be implemented on an ongoing basis throughout and after construction, as required.

Enforcement: Central Valley Regional Water Quality Control Board as appropriate depending on agency jurisdiction, and as determined during the Section 401 and Section 404 permitting processes; and the City of Rancho Cordova Planning Department.

PP

Under the Proposed Project Alternative, a total of approximately 24 acres of USACE-jurisdictional waters of the U.S. would be permanently lost. Direct impacts consist of approximately 23 acres of impacts within the SPA and approximately 1 acre of impacts in off-site backbone infrastructure. In addition, there are a total of approximately 30 acres of waters of the U.S located within 250 feet of proposed project development. Waters of the U.S. within 250 feet of project development consist of approximately 15 acres within the SPA and approximately 15 acres off-site. Wetland habitats within 250 feet of project development may be subject to indirect effects, as described below. Table 3.3-4 provides a summary of existing, affected, and preserved wetlands and other waters of the U.S. for the Proposed Project Alternative. Implementing the project would also result in loss of approximately 0.01 acre of non-USACE-jurisdictional vernal pools that are considered waters of the state.

Table 3.3-4
Summary of Impacts and Preservation of Waters of the U.S. for the Proposed Project Alternative[1]

Habitat Type	Acres Existing	Acres of Direct Impacts	Acres of On-site Preservation2	Acres of On-site Wetlands within 250 Feet of Development	Acres of Off-site Wetlands within 250 Feet of Development[3]
Vernal Pool	27.22	14.50	12.72	9.95	7.51
Seasonal Wetland	2.64	1.11	1.53	1.22	3.14
Swale	6.46	4.52	1.94	1.68	2.36
Ephemeral Drainage	0.90	0.90	0.00	0.00	0.00
Intermittent Drainage	0.98	0.17	0.81	0.54	0.00
Pond	2.06	2.06	0.00	0.00	0.65
Stream	3.42	0.91	2.51	1.69	1.63
Total	**43.68**	**24.17**	**19.50**	**15.08**	**15.29**

Notes:
1 Acreages have been rounded.
2 Preservation acreage listed includes acreage within 250 feet of developed land uses.
3 Wetlands that are off-site, but within 250 feet of on-site project development.
Source: ECORP 2011

Although a substantial loss of wetlands would occur, a total of just over19 acres (approximately 45%) of the existing wetland acreage, including most of the Laguna Creek tributary stream channel (i.e., Kite Creek), would be protected within a proposed 204-acre network of designated wetland preserves. Exhibit 3.3-3 depicts aquatic resources in the SPA relative to the wetland preserve areas and impact areas for the Proposed Project Alternative. The proposed wetland preserve network connects to an existing wetland preserve on the Anatolia development adjacent to the northwest corner of the Luxori property and the northwest corner of the Shalako property. The proposed preserve would also connect with a planned wetland preserve on the Ranch at Sunridge project site adjacent to the north of the Kamilos property and a planned wetland preserve on the Arboretum project site adjacent to the south of the Shalako property.

A cluster analysis was performed by ECORP (2011) to identify wetland complexes within the SPA. The cluster analysis used a GIS model to determine spatial relationships between individual vernal pools based on distances between pools and pool densities within buffer intervals of 100 feet, 150 feet, and 250 feet. The model works by dissolving the boundaries between overlapping buffers and grouping wetlands into discrete wetland cluster polygons. A cluster was defined as three or more depressional seasonal wetlands within the specified buffer distance. The results of the cluster analysis are depicted in Exhibit 3.3-5. This analysis shows that the proposed wetland preserve design would maintain 85% of the wetland clusters within a 100-foot buffer, 75% within a 150-foot buffer, and 65% within a 250-foot buffer.

Vernal pools and other wetland habitat types within the wetland preserve and on adjacent land uses could be adversely affected by habitat fragmentation and resulting indirect impacts. Habitat fragmentation can result when development occurs within larger regions of natural habitat. The effects of habitat fragmentation can extend beyond the boundaries of an area proposed for development. Changes to the hydrologic pattern as a result of project development, including fragmentation of tributaries to Laguna Creek, could adversely affect the wetlands within the on-site wetland preserve and other off-site wetlands by altering hydration periods. Construction of the proposed extension of Americanos Boulevard and other roadway improvements could disrupt or eliminate hydrologic connectivity that is important to support vernal pools and the plant and wildlife species that inhabit the pools. Construction design includes measures to avoid interference with the hydrology that sustains vernal pools on site including a culverted design where the southern portion of Rancho Cordova Parkway crosses the wetland preserve adjacent to the Anatolia development and the use of bridge systems such as, but not limited to, Con/Span®, as natural substrate span crossings over Kite Creek. Americanos Boulevard and two other roadways would cross Kite Creek with a clear span of the delineated wetlands within the channel bank. These natural substrate span crossings would be sized to provide for wildlife movement and minimize habitat fragmentation. Bridge design would include a large enough span area to provide movement corridors for terrestrial wildlife even during high flows (i.e., dry land would be present beneath the bridge span during high flows).

Potential significant indirect effects of the Proposed Project Alternative on vernal pools and other wetlands resulting from increased urbanization and population include reduction in water quality caused by urban runoff, erosion, and siltation; intrusion of humans and domestic animals into the wetland preserve and off-site areas that support sensitive habitats; introduction of invasive plant species that could result in habitat degradation; and changes in management regimes, such as elimination of grazing and implementation of stronger fire suppression policies, that degrade current habitat values.

Indirect effects on preserved wetlands from hydrological alteration would be minimized by maintaining sufficient watershed area to preserve preconstruction hydrological functions and values. ECORP performed an analysis of surface flows and watershed requirements using Sacramento County Light Detection and Ranging (LiDAR) data (2004, cited by ECORP 2011) and GIS modeling (a sink modified version of the industry standard D8 flow model developed by Jenson and Dominguez [1988, cited by ECORP 2011]), to help configure preserve boundaries in a manner that would minimize changes in wetland hydrology. The flow model identifies discrete watershed areas and detailed flow patterns across the wetland complexes on site. The preserve design was refined based on the watershed analysis resulting in a configuration ensuring that future development on adjacent properties would maintain appropriate watersheds for the preserved habitat, provide sufficient buffers, and minimize potential indirect impacts. Based on the watershed analysis, approximately 18 acres of the 19 acres of wetlands in the Proposed Project Alternative preserve area boundary would have sufficient watershed and buffer areas to fully maintain preproject functions and conditions and only 1 acres of preserved wetlands would be subject to indirect effects as a result of hydrological modification.

Although there are approximately 15 acres of off-site wetlands and other waters within 250 feet of proposed project development, all but approximately 1 acre of these habitats are either separated from the SPA by an existing road or are within areas proposed for development as part of other planned projects. While none of these projects have been approved, CEQA/NEPA documentation for these projects is underway and USACE has received CWA Section 404 permit applications for fill of these waters of the U.S. USACE has indicated that they would not hold the Sun Creek Specific Plan project applicants responsible for indirect impacts on these waters because impacts on these waters are being addressed as part of other projects that would affect them directly. Waters that are separated from the SPA by existing roads and would not be affected by road widening as part of the SunCreek project would not be expected to be substantially affected by hydrological or water quality changes resulting from project implementation, unless they are connected to affected drainages in the SPA that cross under the road.

The loss and degradation of USACE-jurisdictional vernal pools and other wetland habitats under the Proposed Project Alternative constitutes a substantial adverse effect on Federally protected waters of the U.S., including wetlands, as defined by Section 404 of the CWA. Even with creation of the wetland preserve, this would be a **direct** and **indirect significant** impact.

Mitigation Measure: Implement Mitigation Measure 3.3-1a.

Mitigation Measure 3.3-1b: Secure CWA Section 404 Permit and Implement All Permit Conditions, and Ensure No Net Loss of Wetlands and other Waters of the United States and Associated Functions.

Before the approval of grading and improvement plans and before any ground-disturbing activity associated with each distinct discretionary development entitlement, the project applicants for any particular discretionary development application requiring fill of wetlands or other waters of the U.S. or waters of the state shall obtain all necessary permits under Sections 401 and 404 of the CWA or the state's Porter-Cologne Act for the respective phase. For each respective discretionary development entitlement, all permits, regulatory approvals, and permit conditions for effects on wetland habitats shall be secured before implementation of any grading activities within 250 feet (or lesser distance deemed sufficiently protective by a qualified biologist approved by USFWS and USACE) of waters of the U.S. or wetland habitats, including waters of the state, that potentially support Federally listed species, or within 100 feet of any other waters of the U.S. or wetland habitats, including waters of the state. The project applicants shall commit to replace or restore on a "no net loss" of function basis (in accordance with USACE and the Central Valley RWQCB) the acreage of all wetlands and other waters of the U.S. that would be removed, lost, and/or degraded as a result of implementing project plans for that phase.

Wetland habitat shall be restored or replaced at an acreage and location and by methods agreeable to USACE, the Central Valley RWQCB, and the City, as appropriate, depending on agency jurisdiction, and as determined during the Section 401 and Section 404 permitting processes, sufficient to achieve the "no net loss" standard.

As part of the Section 404 permitting process, a draft wetland mitigation and monitoring plan (MMP) shall be developed for the project and submitted to USACE, the Central Valley RWQCB, and the City for review and approval of those portions of the plan over which they have jurisdiction. The MMP would have to be finalized and approved prior to issuance of a grading permit for any project phase that would adversely affect wetlands or other waters of the U.S. or waters of the state. The MMP shall be implemented before beginning ground-disturbing activities in any project phase that would adversely affect wetlands or other waters of the U.S. or waters of the state. Once the final MMP is approved and implemented, mitigation monitoring shall continue for a minimum of 5 years from completion of mitigation, or approved human intervention (including recontouring and grading), or until the performance standards identified in the approved MMP have been met, whichever is longer.

As part of the MMP, the project applicants shall prepare and submit plans for the creation of aquatic habitat to adequately offset and replace the aquatic functions and services that would be lost at the SPA, account for the temporal loss of habitat, and contain an adequate margin of safety to reflect anticipated success. Restoration of previously altered and degraded wetlands shall be a priority of the MMP for offsetting losses of aquatic functions in the SPA because it is typically easier to achieve functional success in restored wetlands than in those created from uplands. The MMP must demonstrate how the aquatic functions that would be lost through project implementation will be replaced.

The habitat MMP for jurisdictional wetland features shall be consistent with USACE's and EPA's April 10, 2008 Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (73 CFR 19594) and

USACE's October 26, 2010 *Memorandum Re: Minimum Level of Documentation Required for Permit Decisions* (USACE 2010). According to the Final Rule, mitigation banks should be given preference over other types of mitigation because much of the risk and uncertainty regarding mitigation success is alleviated by the fact that mitigation bank wetlands must be established and demonstrating functionality before the USACE will approve the sale of credits. The use of mitigation bank credits also alleviates temporal losses of wetland function while compensatory wetlands are being established. Mitigation banks also tend to be on larger, more ecologically valuable parcels and are subjected to more rigorous scientific study and planning and implementation procedures than typical permittee-responsible mitigation sites (USACE and EPA 2008). Permittee-responsible on-site mitigation areas can be exposed to long-term negative effects of surrounding development since they tend to be smaller and less buffered than mitigation banks. The Final Rule also establishes a preference for a "watershed approach" in selecting locations for compensatory mitigation project locations, that mitigation selection must be "appropriate and practicable" and that mitigation banks must address watershed needs based on criteria set forth in the *Final Rule*. The watershed approach accomplishes this objective by expanding the informational and analytic basis of mitigation project site selection decisions and ensuring that both authorized impacts and mitigation are considered on a watershed scale rather than only project by project. This requires a degree of flexibility so that district engineers can authorize mitigation projects that most effectively address the case-specific circumstances and needs of the watershed, while remaining practicable for the permittee. The majority of the SPA is within the Laguna Creek Watershed, but the northwest portion of the Kamilos property is within the Morrison Creek Watershed. Both of these watersheds are part of the Lower Sacramento River Watershed. As shown in Table 3.3-5, as of the writing of this document, mitigation credits are available within the Laguna Creek Watershed at the Bryte Ranch, Laguna Terrace East, and the Sunrise Douglas Conservation Banks; however, there are no available mitigation credits within the Morrison Creek Watershed. If USACE determines that the use of mitigation bank credits is not sufficient mitigation to offset impacts within the SPA, the October 26, 2010 *Memorandum Re: Minimum Level of Documentation Required for Permit Decisions* requires USACE to specifically demonstrate why the use of bank credits is not acceptable to USACE in accordance with Section 33 CFR 332.3(a)(1).

Mitigation for SunCreek impacts must be consistent with the USACE's *Record of Decision for the Sunridge Properties*, as stated below:

> The Corps recognizes the significant cumulative loss of vernal pool wetlands within the Mather Core Recovery Area. For future unavoidable impacts to vernal pool wetlands within the Mather Core Recovery Area, including those associated with the Arista del Sol project, compensatory mitigation shall be:
>
> (1) Based on a method for assessing the functions of all waters of the U.S. on the project site;
>
> (2) Accomplished at a ratio of greater than 1:1 (final ratio will be based, in part, on wetland functional condition determined during the functional assessment), after considering direct and indirect impacts, temporal loss and difficulties creating vernal pool wetlands; and
>
> (3) Located in the Mather Core Recovery Area, unless determined impracticable or inappropriate by the Corps.

If the SSHCP is adopted and available before the project is fully implemented, project applicants may participate in the SSHCP mechanisms, such as payment of fees, purchase of mitigation bank credits, acquisition of conservation easement(s), and/or acquisition of mitigation land(s) in fee title to mitigate project effects on wetland habitats. In the event that mitigation is not available through the SSCHP, the applicants shall mitigate by purchasing a combination of appropriate credits from an agency-approved

Table 3.3-5
Mitigation Banks Expected to Have Credits Available for Purchase to Compensate for Project Effects on Wetlands and Other Habitats

Bank Name	Location	Owner	Credit Types	Credits Available
Apple Road[1,2]	Sacramento County	Westervelt	Swainson's hawk foraging habitat	300
			Vernal pool preservation	~50
			Vernal pool creation/restoration	~20
Bryte Ranch[2]	Sacramento County	Stephan Hughes	Swainson's hawk foraging habitat	250
			Vernal pool preservation (vernal pool fairy shrimp and vernal pool tadpole shrimp)	47
Clay Station	Sacramento County	Elliott Conservancy	Seasonal Wetland	pending
			Vernal pool creation (vernal pool fairy shrimp and vernal pool tadpole shrimp)	~10
Cosumnes Floodplain Mitigation Bank	Sacramento County	Westervelt	Floodplain Mosaic wetlands (i.e., Seasonal wetland, freshwater marsh, emergent marsh)	300
			Shaded Riparian Aquatic Habitat	9.4
			Non-Jurisdictional Riparian Habitat (i.e., Riparian woodland, riparian scrub)	126
Deer Creek[1]	Sacramento County	Wildlands	Swainson's hawk foraging habitat	279.91
			Seasonal Wetland Preservation	1.81
			Vernal Pool Creation	9
Gill Ranch Conservation[2]	Sacramento County	Conservation Resources	Vernal Pool Preservation (vernal pool fairy shrimp and vernal pool tadpole shrimp)	60
Laguna Terrace East[2]	Sacramento County	Wildlands	Swainson's hawk*	152.41
			Vernal pool preservation (vernal pool fairy shrimp)	31.57
Locust Road Mitigation Preserve[1]	Placer County	Wildlands	Seasonal wetland creation	1.62
			Vernal pool creation	11.52
			Swainson's hawk foraging habitat	59.3
Placer Fitzgerald Ranch[1,2]	Placer County	Placer Fitzgerald Ranch	Seasonal Swale	0.235
			Seasonal Wetland	3.833
			Swainson's hawk foraging habitat	61.504
			Vernal pool preservation (some legenere)	2.847
			vernal swale preservation	0.205
SMUD Mitigation Preserve[1]	Sacramento	SMUD	Swainson's hawk foraging habitat	~1,140
			Vernal Pool Creation	25
			Waters of the U.S. preservation	56
Toad Hill Ranch	Placer County	Wildlands	Vernal pool creation/restoration	48
Twin City[1,2]	Sacramento County	Wildlands	Riparian scrub	1.76
			Seasonal wetland/riparian	2.8
			Swainson's hawk foraging habitat	186.21
			Vernal pool creation	2.19
			Vernal pool preservation	12.04
Van Vleck Ranch	Sacramento County	Westervelt	Vernal pool preservation (vernal pool fairy shrimp)	8.13
			Vernal pool creation/restoration	0.19 + 14
			Swainson's hawk foraging habitat	505

Note:
1 Bank is currently going through the entitlement process and has not yet received approval of service areas or available credits.
2 There are no USACE approved or pending banks and may be USFWS potential bank.
Source: ECORP 2010

mitigation bank or providing an agency-approved off-site mitigation area. The applicants' biological consultant, ECORP, has identified a number of mitigation banks whose service areas appear to include the SPA (Table 3.3-5). However, some of these banks are not yet approved and the availability of credits at the other banks is subject to change. Therefore, a combination of mitigation bank credits and permittee-responsible on and off-site mitigation may be necessary to fully offset project impacts on wetlands and other waters of the U.S.

Compensatory mitigation for losses of stream and ephemeral and intermittent drainage channels shall be achieved through in-kind preservation, restoration, or enhancement, as specified in the Final Rule guidelines. The wetland MMP shall address how to mitigate impacts on vernal pool, seasonal wetland, swale, pond, and intermittent and ephemeral stream habitat, and shall describe specific method(s) to be implemented to avoid and/or mitigate any off-site project-related impacts. The wetland compensation section of the habitat MMP shall include the following:

- compensatory mitigation sites and criteria for selecting these mitigation sites. In General, compensatory mitigation sites should meet the following criteria, based on the Final Rule;
  - located within the same watershed as the wetland or other waters that would be lost, as appropriate and practicable;
  - located in the most likely position to successfully replace wetland functions lost on the impact site considering watershed-scale features such as aquatic habitat diversity, habitat connectivity, available water sources and hydrologic relationships, land use trends, ecological benefits, the likelihood of success and sustainability, and compatibility with adjacent land uses,
- a complete assessment of the existing biological resources in both the on-site preservation areas and off-site compensatory mitigation areas, including wetland functional assessment using the California Rapid Assessment Method (Collins et al. 2008), to establish baseline conditions;
- specific creation and restoration plans for each mitigation site;
- use of CRAM to compare compensatory wetlands to the baseline CRAM scores from wetlands in the SPA. The compensatory wetland CRAM scores shall be compared against the highest quality wetland of each type from the SPA;
- CRAM scores, or other wetland assessment protocol scores, from the compensatory wetlands shall be compared against the highest quality wetland scores for each wetland type to document success of compensatory wetlands in replacing the functions of the affected wetlands to be replaced;
- monitoring protocol, including schedule and annual report requirements, and the following elements:
  - ecological performance standards, based on the best available science, that can be assessed in a practicable manner (e.g., performance standards proposed by Barbour et al. 2007). Performance standards must be based on attributes that are objective and verifiable;
  - CRAM, or other USACE-approved wetland assessment protocol, conducted annually for 5 years after construction or restoration of compensatory wetlands to determine whether these areas are acquiring wetland functions and to plot the performance trajectory of compensatory wetlands over time.

For each phase of development, the project applicants shall secure the permits and regulatory approvals described below and shall implement all permit conditions. All permits, regulatory approvals, and permit conditions for effects on wetland habitats shall be secured prior to implementing any grading activities within 250 feet of waters of the U.S. or wetland habitats that potentially support Federally listed species. The setback may be reduced to a distance approved by the City and USFWS if a wetland avoidance plan is developed and implemented by a qualified biologist. The wetland avoidance plan must be approved by USFWS and the City and shall demonstrate that all direct and indirect impacts on wetlands will be avoided. Project phases in upland areas with no wetlands or waters of the U.S. within 250 feet, and no overland hydrologic flow patterns, the disturbance of which may affect such waters, may begin construction before these particular permits are obtained. Buffers around wetlands that do not support Federally listed species shall be a minimum of 50 feet from the edge of these features in accordance with conditions of the NPDES permit and associated best management practices (BMPs).

Water Quality certification pursuant to Section 401 of the Clean Water Act will be required prior to issuance of a Section 404 permit. Before construction in any areas containing wetland features, the project applicants shall obtain water quality certification for the applicable phase of the project. Any measures required as part of the issuance of water quality certification shall be implemented.

Implementation: Project applicants for any particular discretionary development application requiring fill of wetlands or other waters of the U.S. or waters of the state.

Timing: Before the approval of grading or improvement plans or any ground-disturbing activities for any project development phase containing wetland features or other waters of the U.S. The MMP must be approved before any impact on wetlands can occur. Mitigation shall be implemented on an ongoing basis throughout and after construction, as required.

Enforcement: U.S. Army Corps of Engineers, Sacramento District; Central Valley Regional Water Quality Control Board as appropriate depending on agency jurisdiction, and as determined during the Section 401 and Section 404 permitting processes; and the City of Rancho Cordova Planning Department.

BIM

Impacts on waters of the U.S., including wetlands, would be considerably less under the Biological Impact Minimization Alternative than under the Proposed Project, Conceptual Strategy, or Increased Development Alternative (Table 3.3-3) because the acreage of wetland preserve would be increased to 411 acres, nearly double the acreage preserved under the Proposed Project. Approximately 15 acres of jurisdictional wetlands and other waters of the U.S. would be permanently lost under the Biological Impact Minimization Alternative (Exhibit 3.3-6). That is substantially lower than under the Proposed Project, Conceptual Strategy, or Increased Development Alternatives, which would directly affect approximately 24, 23, and 33 acres of waters of the U.S., respectively. The loss of waters of the U.S., including wetlands, that would result from implementing this alternative would be a **direct significant** impact, but would be substantially less than the Proposed Project Alternative. ***[Lesser]***

Indirect effects would be similar to those discussed above under the Proposed Project Alternative; however, establishment of a larger wetland preserve would create a greater buffer area (i.e., greater distance between preserved wetlands and developed land uses) around many of the wetlands in the preserve and maintain greater hydrological connectivity between on-site and off-site aquatic habitats. Furthermore, there would be no roadways constructed through the wetland preserves under this alternative so the indirect effects of habitat fragmentation would be reduced. These measures would reduce but not eliminate disturbance to wetlands. The total acreage of waters of the U.S. within 250 feet of development proposed under this alternative would be approximately 34 acres compared to approximately 30 acres under the Proposed Project Alternative. Therefore, the Biological Impact Minimization Alternative would result in similar **indirect significant** impacts as the Proposed Project Alternative. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.3-1a and 3.3-1b.

CS

Direct impacts on waters of the U.S., including wetlands, would be comparable under the Conceptual Strategy Alternative to the Proposed Project Alternative even though the acreage of wetland preserve would be increased to 310 acres, nearly 100 acres more than under the Proposed Project Alternative. Exhibit 3.3-7 depicts aquatic resources in the SPA relative to the wetland preserve areas and impact areas for the Proposed Project Alternative. Approximately 23 acres of waters of the U.S. would be permanently lost under the Conceptual Strategy Alternative compared to approximately 24 acres under the Proposed Project Alternative (Table 3.3-3), a difference of about 1 acre. Therefore, **direct significant** impacts would occur. ***[Similar]***

Indirect effects would be similar to those discussed above under the Proposed Project Alternative. Establishment of a larger wetland preserve would create a greater buffer area around some of the wetlands in the preserve, which would reduce but not eliminate disturbance to wetlands. Furthermore, roadways would not be constructed through the wetland preserves under this alternative as they would under the Proposed Project Alternative, so the indirect effects of habitat fragmentation would be reduced. The total acreage of waters of the U.S. within 250 feet of development under this alternative would be approximately 27 acres compared to approximately 30 acres under the Proposed Project. Therefore, the Conceptual Strategy Alternative would result in **indirect significant** impacts, but to a lesser extent than the Proposed Project Alternative. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measures 3.3-1a and 3.3-1b.

ID

Direct impacts on waters of the U.S., including wetlands, would be greater under the Increased Development Alternative compared to the Proposed Project Alternative (Table 3.3-3), because more wetlands would be filled. Under this alternative, approximately 12 acres of waters of the U.S. would be preserved within a 97-acre wetland preserve network. Exhibit 3.3-8 depicts aquatic resources in the SPA relative to the wetland preserve areas and impact areas for the Increased Development Alternative. Approximately 33 acres of waters of the U.S. would be permanently lost under the Increased Development Alternative compared to approximately 24 acres under the Proposed Project. Therefore, **direct significant** impacts would occur and would be greater than under the Proposed Project Alternative. ***[Greater]***

Indirect effects would be similar to those discussed above under the Proposed Project Alternative. The total acreage of waters of the U.S. within 250 feet of project development under this alternative would be approximately 31 acres compared to approximately 30 acres under the Proposed Project. Therefore, the Increased Development Alternative would result in **indirect significant** impacts. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.3-1a and 3.3-1b.

Implementation of Mitigation Measures 3.3-1a and 3.3-1b would reduce direct significant impacts on jurisdictional wetlands and other waters of the U.S. resulting from the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives, but not necessarily to a less-than-significant level. After a mitigation plan has been accepted by USACE and is implemented as required (including on-site preservation and purchase of credits at a mitigation bank and/or in-lieu fee mitigation), the direct impacts resulting from project implementation could be mitigated by providing “no net loss” of overall wetland acreage resulting from the project, as required in USACE permit conditions, if a permit is issued. However, USACE requires mitigation resulting in no net loss of wetland functions. Removal of approximately 24 acres of waters of the U.S., including vernal pools and other similar wetland habitats is a substantial loss, especially when considered in the context of rate and acreage of habitat losses in the region and within the Mather Core Area, which is considered vital to the recovery of Federally listed vernal pool fairy shrimp and vernal pool tadpole

TOTAL AVOIDANCE & IMPACT

	Avoided	Direct Impacts		Wetlands within 250' of Development[2]		Existing Acreage
		Onsite	Offsite[3]	Onsite	Offsite[3]	
Vernal Pool	7.579	18.703	1.059	7.494	8.267	27.341[1]
Seasonal Wetland	0.228	2.316	0.148	0.228	3.223	2.692
Swale	0.734	5.617	0.118	0.734	2.776	6.469
Ephemeral Drainage	0.458	0.445	0.000	0.458	0.000	0.903
Intermittent Drainage	0.781	0.200	0.004	0.781	0.004	0.985
Pond	0.000	2.056	0.151	0.000	2.599	2.207
Stream	2.585	0.752	0.276	2.585	1.953	3.613
Isolated Vernal Pool	0.000	0.012	0.000	0.000	0.000	0.012
Total	*12.365*	*30.101*	*1.756*	*12.280*	18.822	44.222

NOTES

Gross project acreage: +/- 1265 ac.

Gross preserve acreage: +/- 95 ac.

Base data source: Wade Associates.

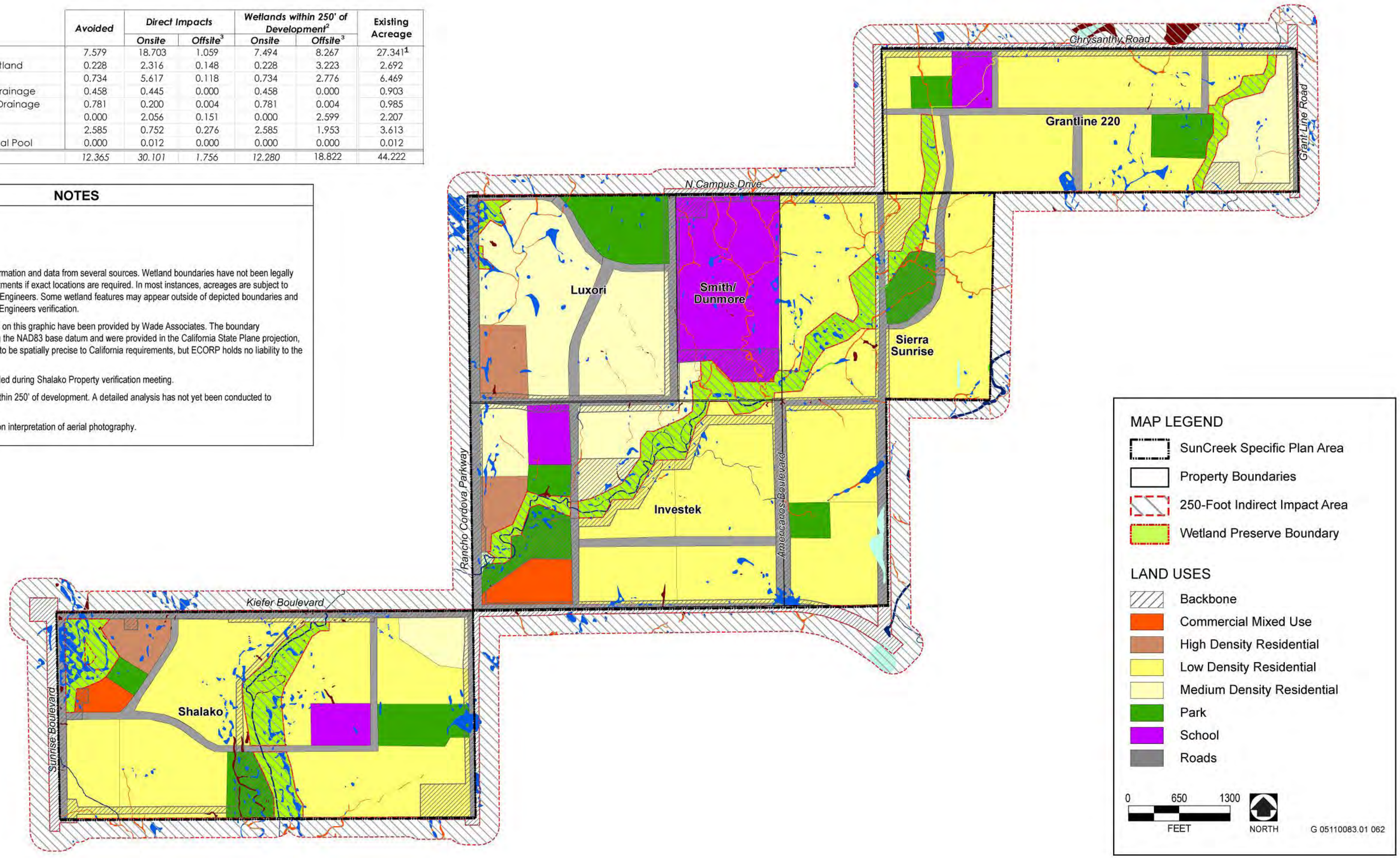
This exhibit depicts wetland/water information and data from several sources. Wetland boundaries have not been legally surveyed and may be subject to adjustments if exact locations are required. In most instances, acreages are subject to verification by the U.S. Army Corps of Engineers. Some wetland features may appear outside of depicted boundaries and were left as is pending Army Corps of Engineers verification.

The project boundary extents depicted on this graphic have been provided by Wade Associates. The boundary coordinates have been surveyed using the NAD83 base datum and were provided in the California State Plane projection, Grid Units. This boundary is expected to be spatially precise to California requirements, but ECORP holds no liability to the accuracy of the boundary.

[1] Includes 0.771 acres of wetlands added during Shalako Property verification meeting.

[2] Acreage is for all wetland features within 250' of development. A detailed analysis has not yet been conducted to determine potential indirect impacts.

[3] Offsite wetland acreages are based on interpretation of aerial photography.



Source: ECORP 2011, Adapted by AECOM in 2011

Increased Development Alternative – Impacts on Wetlands and Other Waters **Exhibit 3.3-8**

shrimp. Temporal losses would occur unless all impacts could be mitigated through purchase of fully functioning, established, in-kind wetlands from an approved mitigation bank and the loss of function would remain significant and unavoidable unless wetland habitat losses were compensated within the Mather Core Area and within the affected watersheds. At this time there are no mitigation credits available within the Mather Core Area and it appears unlikely that suitable land would be available within the Mather Core Area to feasibly create replacement habitat to offset losses that would result from the project.

Mitigation and conservation banks are established through a lengthy review and approval process with the Interagency Review Team (IRT). The IRT is made up of staff members from the EPA, USACE, USFWS, and DFG. Other agencies that are included on the IRT on an as needed basis include the RWQCB and the NMFS. Through the IRT approval process, each bank is responsible for developing performance and success criteria for their respective bank, including watershed level needs. Once approved, this bank is authorized for a phased release of credits based on meeting certain established performance/success criteria occurs. The banks are required to submit annual monitoring reports showing the status of the bank, status of endowment, and performance of habitat. Failure to meet established performance/ success criteria will result in either bank closure or inability to release additional credits until performance/success criteria standards are met. Various agencies from the IRT also serve as third party beneficiaries to the banks; thus, they have the ability to enter the bank at any time to monitor the bank status independently of the bank proprietor's monitoring.

The performance/success criteria standards for each bank are typically based on agency approved templates; however, they can be adjusted to reflect site-specific and watershed conditions. The specific performance/success criteria standards for each bank are considered public information; however, this information is currently only available through a Freedom of Information Act (FOIA) petition. There is limited information available for a few banks on USACE's Regional Internet Banking Information Tracking System (RIBITS); however, the site is limited to banks that offer waters of the U.S. credits and has yet to fully integrate information on banks that offer other types of credits.

The lengthy process that bank proprietors have to follow to begin selling credits was designed to essentially eliminate/reduce the potential for credits to fail to meet established success criteria. Additionally, as each bank is closely monitored by the IRT, this further reduces the potential for credits to fail to meet established success criteria.

Creation and preservation of wetlands within smaller and more fragmented areas surrounded by urban development cannot fully compensate for the whole suite of ecological services provided by larger expanses of interconnected wetland complexes surrounded by open space. Also, if compensatory wetland mitigation could not be provided in the same watershed, an overall loss of function up to the subbasin level could result.

Under the Biological Impact Minimization and No USACE Permit Alternatives, a much larger area of vernal pool habitat would be preserved. Under the No USACE Permit Alternative, no waters of the U.S. or wetlands subject to USACE jurisdiction under the CWA would be filled. However, indirect impacts would remain **significant and unavoidable** for the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives for the following reasons:

- The extent of habitat loss and degradation is extensive and contributes significantly to the loss of this habitat type in the region and within the Mather Core Area.
- Vernal pools and other wetland habitats within the wetland preserve and on adjacent parcels could be adversely affected by habitat fragmentation and indirect impacts for which no feasible mitigation measures are available.

The conclusion that direct and indirect impacts would remain significant and unavoidable pursuant to CEQA and NEPA, however, is separate from the ultimate determination the USACE must make in order to issue permits to fill on-site wetlands, which is whether the project would cause "significant degradation of waters of the United

States." (40 CFR 230.10[c].) This subsequent determination has, by the express terms of the regulation, a necessarily broader focus than the individual watershed approach followed in this analysis. Therefore, the significant and unavoidable conclusion in this analysis does not preclude the USACE from issuing fill permits for the project if it finds the project mitigation is sufficient to avoid "significant degradation of the waters of the United States."

IMPACT 3.3-2 **Loss and Degradation of Sensitive Natural Communities.** *Implementation of the project would result in modifications to a tributary stream regulated under the California Fish and Game Code and in the loss of riparian scrub habitat considered sensitive by state and local resource agencies and requiring consideration under CEQA.*

NP

Because no development would occur under the No Project Alternative, there would be no project-related ground-disturbing activities that would affect riparian habitat or other sensitive natural communities; thus, **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP

Because the riparian habitat on the SPA is within jurisdictional waters of the U.S. that would be avoided under the No USACE Permit Alternative, there would be no project-related ground-disturbing activities that would affect riparian habitat or other sensitive natural communities; thus, **no direct** or **indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

PP, BIM, CS, ID

Riparian Habitat

Riparian habitat that would be lost as a result of implementing the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives consists of 0.78 acre of riparian scrub. The riparian scrub habitat is found within the two on-site ponds and consists of relatively young trees and shrubs. Because these two patches of riparian habitat are extremely small and do not support large trees for raptor nesting, they do not, by themselves, provide important functions and values for wildlife (e.g., nesting, foraging, and shelter) and loss of this minimal amount of riparian vegetation would not substantially contribute to the overall loss and alteration of naturally occurring riparian habitat in the City or the region. Therefore, **direct** impacts from the loss of riparian habitat under the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives are considered **less than significant**. **No indirect** impacts would occur.

Streambed Alteration

Implementing the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives would result in changes to the natural flow and modifications to the bed, channel, and bank of Kite Creek, which is a tributary of Laguna Creek. This tributary supports wildlife resources that are subject to regulation by DFG under Section 1602 of the California Fish and Game Code and construction affecting the bed, channel, or bank would require issuance of a streambed alteration agreement. In addition, DFG may take jurisdiction of the on-site stock ponds when it evaluates project requirements resulting from issuance of a streambed alteration agreement for modifications to portions of Kite Creek. Stream alteration, including fragmentation of tributaries to Laguna Creek, could result in indirect impacts from changes to the hydrologic pattern that could adversely affect downstream aquatic habitats both on and off the SPA. Therefore, a **direct** and **indirect significant** impact would occur.

Mitigation Measure: Implement Mitigation Measures 3.3-1a and 3.3-1b.

Mitigation Measure 3.3-2: Secure Section 1602 Streambed Alteration Agreement and Implement all Conditions of the Agreement.

A Section 1602 Streambed Alteration Agreement from DFG shall be obtained by the project applicants prior to construction affecting the bed and bank of Kite Creek or the on-site ponds. Issuance of the Streambed Alteration Agreement requires the preparation of a habitat mitigation plan by the project applicants. The habitat mitigation plan would be developed to adequately cover impacts to the stream channel of Kite Creek at adequate ratios as determined by the City in cooperation with DFG. It is likely that mitigation developed for impacts on waters of the U.S. would be satisfactory to mitigate the impacts from streambed alteration and that DFG would not require additional mitigation for the streambed alteration agreement. Any conditions of issuance of the streambed alteration agreement shall be implemented as part of project construction activities that affect any portion of Kite Creek or the on-site ponds.

Implementation:	Project applicants for any particular discretionary development application that requires fill or alteration of the bed or bank of Kite Creek or the on-site ponds.
Timing:	Prior to any construction within 250 feet of Kite Creek or the on-site ponds.
Enforcement:	California Department of Fish and Game and the City of Rancho Cordova Planning Department.

Implementing Mitigation Measure 3.3-2 would reduce the direct and indirect significant impact from alteration of Kite Creek and the on-site ponds to a **less-than-significant** level because it would require the project applicants to consult with and obtain agreements from DFG, which would result in project replacement of stream and pond habitats, including riparian habitats on the banks of the streams and ponds, on a no-net-loss basis, because the project applicants would be required to implement all permit conditions.

IMPACT 3.3-3 **Loss and Degradation of Habitat for Special-Status Wildlife.** *Implementation of the project would result in the loss and degradation of habitat for vernal pool invertebrates, VELB, western spadefoot, western pond turtle, American badger, loggerhead shrike, Swainson's hawk, white-tailed kite, and other raptors. Take of listed species, including vernal pool invertebrates, VELB, and Swainson's hawk, could also occur.*

NP

Under the No Project Alternative no development would occur, therefore no project-related ground-disturbing activities that would affect wildlife habitat would occur. Therefore, **no direct** or **indirect** impacts on special-status wildlife would occur under the No Project Alternative. ***[Lesser]***

NCP

Federally Listed Vernal Pool Invertebrates and Western Spadefoot

The No USACE Permit Alternative would not result in fill of vernal pools, seasonal wetlands, and swales, which are potential habitat for vernal pool fairy shrimp, vernal pool tadpole shrimp, and western spadefoot. No development would occur within 50 feet of wetland features and free spanning bridges would be constructed over waterways to avoid impacts from roadways. This alternative would designate an additional 403 acres of open space compared to the Proposed Project Alternative. Compared to the other project action alternatives, the No USACE Permit Alternative would preserve a larger portion of wetlands within the SPA, provide a larger buffer to minimize impacts of adjacent land uses, and preserve a greater proportion of upland habitat to support species that use both wetland and upland habitats. However, mixed-use development would still be constructed in adjacent uplands. Although they would be lessened, indirect effects on wetlands from topographic modifications, creation of impervious surfaces, urban runoff, erosion, siltation, contaminants present in runoff, intrusion of humans and domestic animals, and introduction of invasive plant species could result in habitat degradation. Implementation of the No USACE Permit Alternative would result in **no direct** impacts to wildlife species associated with vernal pools; however **indirect significant** impacts would still occur because of alteration of site topography, increased impervious surfaces, and urban development adjacent to wetland habitats, but to a lesser degree because there would be a larger buffer between vernal pool habitats and adjacent land uses. Under this alternative, approximately 32 acres of wetland habitat potentially suitable for vernal pool invertebrates and western spadefoot could be subject to indirect impacts because development would occur within 250 feet. Indirect impacts could also include mortality related to an increase in vehicular traffic on and near the project site, noise and vibration disturbance causing toads to break dormancy, and exposure to herbicides, pesticides, and other toxins. In addition, if present, western spadefoot could be killed during construction activities. Furthermore, over 600 acres of grassland habitat would be developed and would no longer be available as aestivation habitat for western spadefoot; however, less annual grassland habitat would be converted to development under this alternative than under any of the other action alternatives. ***[Lesser]***

Valley Elderberry Longhorn Beetle

Under the No USACE Permit Alternative, the single elderberry shrub present on the SPA would not be removed because it is on the bank of a pond that is a water of the U.S. and would be preserved. Therefore, **no direct** or **indirect** impacts on VELB would occur under this alternative. ***[Lesser]***

Western Pond Turtle

Under the No USACE Permit Alternative, **no direct** impacts on western pond turtle would occur because the on-site stock ponds plus a 50-foot upland buffer would be preserved. However, indirect impacts from topographic modifications, creation of impervious surfaces, urban runoff, erosion, siltation, and contaminants present in runoff, intrusion of humans and domestic animals, and introduction of invasive plant species could result in habitat degradation and would reduce potential nest habitat because land outside of the 50-foot buffer would be converted to urban uses. Therefore, **indirect significant** impacts would occur. ***[Lesser]***

Swainson's Hawk and Other Raptors

Implementation of the No USACE Permit Alternative would result in the direct loss of approximately 659 acres of grassland that provides foraging habitat for Swainson's hawk and other raptors and provides nesting and foraging habitat for burrowing owl and northern harrier. This is approximately 381 acres less than would be lost under the Proposed Project Alternative. Under the No USACE Permit Alternative, scattered trees that provide potential nest sites for tree nesting raptors would still be removed. In addition, this alternative would result in indirect effects to the nesting and foraging habitat remaining in the SPA due to disturbance from use of adjacent development, which could reduce nest success and foraging habitat quality. Therefore, **direct** and **indirect** impacts to Swainson's hawk and other raptors would be **significant**, but to a lesser extent than the Proposed Project Alternative. ***[Lesser]***

Grasshopper Sparrow and Loggerhead Shrike

Implementing the No USACE Permit Alternative would permanently remove 659 acres of annual grassland that provides suitable nesting and foraging habitat for grasshopper sparrow and suitable foraging habitat for loggerhead shrike. Shrubs and trees that provide potential nesting habitat for loggerhead shrike would also be removed. Grassland habitat preserved on the SPA may no longer be suitable for these species because of disturbances from surrounding development. However, these species generally require smaller tracts of habitat relative to the raptors discussed above. Annual grassland habitat would remain relatively abundant in the region and loss of habitat from the SPA is not likely to result in a substantial decline in local population numbers. Therefore, **direct** and **indirect** impacts on loggerhead shrike and grasshopper sparrow are considered **less than significant**. ***[Lesser]***

American Badger

Under the No USACE Permit Alternative approximately 659 acres of dry, open, annual grassland habitat suitable for American badger would be permanently removed from the SPA. American badger requires a large home range for survival; therefore, the removal of habitat and resulting fragmentation from implementing the No USACE Permit Alternative could result in indirect impacts to American badger through habitat modification. However, the loss of habitat from the SPA would not be likely to cause loss of individuals because there would still be adequate suitable foraging and denning habitat in the area to support the local population. Therefore, **direct** and **indirect** impacts to American badger are considered **less than significant**. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3.3-1a (to reduce indirect impacts on vernal pool invertebrates, western spadefoot, and western pond turtle).

Mitigation Measure 3.3-3a: Conduct Preconstruction Surveys for Nesting Swainson's Hawk, White-Tailed Kite, Burrowing Owls, and Other Raptors, and if Found, Establish Appropriate Buffers, and Implement Avoidance or Appropriate Mitigation.

To mitigate impacts on Swainson's hawk and other raptors (including burrowing owl), the project applicants for any particular discretionary development application shall retain a qualified biologist to conduct preconstruction surveys and to identify active nests on and within 0.5 mile of the SPA and active burrows in the SPA. The surveys shall be conducted before the approval of grading and/or improvement plans (as applicable) and no less than 14 days and no more than 30 days before the beginning of construction for all project phases. To the extent feasible, guidelines provided in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) shall be followed for surveys for Swainson's hawk. If no nests are found, no further mitigation is required.

If active nests are found, impacts on nesting Swainson's hawks and other raptors shall be avoided by establishing appropriate buffers around the nests. No project activity shall commence within the buffer area until the young have fledged, the nest is no longer active, or until a qualified biologist has determined in coordination with DFG that reducing the buffer would not result in nest abandonment. DFG guidelines recommend establishing buffers of 0.25- to 0.5-mile, but the size of the buffer may be adjusted if a qualified biologist and the City, in consultation with DFG, determine that such an adjustment would not be likely to adversely affect the nest. Monitoring of the nest by a qualified biologist during and after construction activities will be required if the activity has potential to adversely affect the nest.

If active burrows are found, a mitigation plan shall be submitted to the City for review and approval before any ground-disturbing activities. The City shall consult with DFG regarding appropriate mitigation before approving the mitigation plan. The mitigation plan may consist of installation of one-way doors on all burrows to allow owls to exit, but not reenter, and construction of artificial burrows within the project vicinity, as needed; however, burrowing owl exclusions may only be used if a qualified biologist verifies that the burrow does not contain eggs or dependent young. If active burrows contain eggs and/or young, no construction shall occur within 50 feet of the burrow until young have fledged. Once it is confirmed that there are no owls inside burrows, these burrows may be collapsed.

Implementation: Project applicants for any particular discretionary development application.

Timing: Before approval of grading or improvement plans or any ground-disturbing activities, including grubbing or clearing, for any project phase.

Enforcement: City of Rancho Cordova Planning Department; California Department of Fish and Game (if applicable)

Mitigation Measure 3.3-3b: Prepare and Implement a Swainson's Hawk Mitigation Plan.

To mitigate for the loss of Swainson's hawk foraging habitat, the project applicants for any particular discretionary development application shall prepare and implement a Swainson's hawk mitigation plan including, but not limited to the requirements described below.

- Before the approval of grading and improvement plans or before any ground-disturbing activities, whichever occurs first, the project applicants shall preserve, to the satisfaction of the City, suitable Swainson's hawk foraging habitat to ensure 1:1 mitigation of habitat value for Swainson's hawk foraging habitat lost as a result of the project, as determined by the City after consultation with DFG and a qualified biologist.

- The 1:1 habitat value shall be based on Swainson's hawk nesting distribution and an assessment of habitat quality, availability, and use within the City's planning area. The mitigation ratio shall be consistent with the 1994 DFG Swainson's Hawk Guidelines included in the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California*. Such mitigation shall be accomplished through either the transfer of fee title or perpetual conservation easement. The mitigation land shall be located within the known foraging area and within Sacramento County. The City, after consultation with DFG, will determine the appropriateness of the mitigation land.

- Before approval of such proposed mitigation, the City shall consult with DFG regarding the appropriateness of the mitigation. If mitigation is accomplished through conservation easement, then such an easement shall ensure the continued management of the land to maintain Swainson's hawk foraging values, including but not limited to ongoing agricultural uses and the maintenance of all existing water rights associated with the land. The conservation easement shall be recordable and shall prohibit any activity that substantially impairs or diminishes the land's capacity as suitable Swainson's hawk habitat.

- The project applicants shall transfer said Swainson's hawk mitigation land, through either conservation easement or fee title, to a third-party, nonprofit conservation organization (Conservation Operator), with the City and DFG named as third-party beneficiaries. The Conservation Operator shall be a qualified conservation easement land manager that manages land as its primary function. Additionally, the Conservation Operator shall be a tax-exempt nonprofit conservation organization that meets the criteria of Civil Code Section 815.3(a) and shall be selected or approved by the City, after consultation with DFG. The City, after consultation with DFG and the Conservation Operator, shall approve the content and form of the conservation easement. The City, DFG, and the Conservation Operator shall each have the power to enforce the terms of the conservation easement. The Conservation Operator shall monitor the easement in perpetuity to assure compliance with the terms of the easement.

- The project applicants, after consultation with the City, DFG, and the Conservation Operator, shall establish an endowment or some other financial mechanism that is sufficient to fund in perpetuity the operation, maintenance, management, and enforcement of the conservation easement. If an endowment is used, either the endowment funds shall be submitted to the City to be distributed to an appropriate third-party nonprofit conservation agency, or they shall be submitted directly to the third-party nonprofit conservation agency in exchange for an agreement to manage and maintain the lands in perpetuity. The Conservation Operator shall not sell, lease, or transfer any interest of any conservation easement or mitigation land it acquires without prior written approval of the City and DFG.

- If the Conservation Operator ceases to exist, the duty to hold, administer, manage, maintain, and enforce the interest shall be transferred to another entity acceptable to the City and DFG. The City Planning Department shall ensure that mitigation habitat is properly established and is functioning as habitat by conducting regular monitoring of the mitigation site(s) for the first 10 years after establishment of the easement.

Implementation: Project applicants for any particular discretionary development application.

Timing: Before issuance of occupancy permit for Phase 1 and future, subsequent improvement plans.

Enforcement: City of Rancho Cordova Planning Department and California Department of Fish and Game

PP, CS

Development under the Proposed Project and Conceptual Strategy Alternatives would result in an increase in development and human population that would result in adverse effects to a number of special-status wildlife species. Special-status wildlife species listed under the Federal ESA that could be substantially affected by the Proposed Project and Conceptual Strategy Alternatives are vernal pool fairy shrimp, vernal pool tadpole shrimp, and VELB. Adverse impacts on Swainson's hawk, listed under CESA as threatened, could also result. In addition, the following fully protected or California species of special concern could be adversely affected by project development: western pond turtle, western spadefoot, grasshopper sparrow, burrowing owl, northern harrier, white-tailed kite, loggerhead shrike, and American badger. Impacts to these species are discussed below.

Federally Listed Vernal Pool Invertebrates and Western Spadefoot

The vernal pool fairy shrimp and vernal pool tadpole shrimp have been identified in several vernal pools on the SPA by Sugnet & Associates (Sugnet & Associates 1993) and Foothill Associates (Foothill Associates 2004). Implementation of the Proposed Project Alternative would permanently remove approximately 20 acres of vernal pools and other wetlands considered habitat for these vernal pool invertebrates. In addition to the direct removal of habitat, the Proposed Project Alternative could have indirect impacts on approximately 26 acres of habitat for Federally listed vernal pool invertebrates that is within 250 feet of lands that would be developed under the Proposed Project.

The Proposed Project Alternative includes a 204-acre Wetland Preserve that would provide some level of protection to portions of the SPA containing the highest density of vernal pools and seasonal wetlands. Wetland acreages within the Wetland Preserve that provide potential habitat for Federally listed vernal pool invertebrates include approximately 13 acres of vernal pools, 1.5 acres of seasonal wetland, and 2 acres of swale. Under the Conceptual Strategy Alternative, the size of the wetland preserve would be increased to 310 acres and would protect roughly 13 acres of vernal pools, 2 acres of seasonal wetland, and 3 acres of swale. The purpose of establishing the on-site wetland preserve is to preserve and enhance existing wetland function and values. However, given the large anticipated increase in urbanization on the adjacent land, indirect impacts from topographic modifications, creation of impervious surfaces, urban runoff, erosion, siltation, contaminants present in runoff, intrusion of humans and domestic animals, and introduction of invasive plant species could result in habitat degradation that could adversely affect vernal pool fairy shrimp and vernal pool tadpole shrimp.

Habitat fragmentation could result in serious indirect effects on vernal pool invertebrates including loss of genetic diversity, vulnerability to extinction due to random catastrophic events, isolation from source populations for recolonization, and reduction of avian dispersal agents. Studies of genetic variation in vernal pool tadpole shrimp indicate that vernal pool systems define populations of vernal pool tadpole shrimp and not individual pools (King et al. 1996, cited in USFWS 2005). Therefore, maintaining intact vernal pool systems is critical to promoting genetic diversity and maintaining the health of individual populations. Implementing the Proposed Project or Conceptual Strategy Alternatives would disrupt vernal pool systems in the SPA by filling portions of these systems and constructing urban development within their microwatersheds. Even within the wetland preserve areas, many of the vernal pool systems would not remain intact, especially following construction of the road crossings through the preserves that would occur under the Proposed Project Alternative. The Proposed Project and Conceptual Strategy Alternatives would result in direct removal of approximately 20 and 19 acres, respectively, of potentially suitable aquatic habitat for vernal pool invertebrates. In addition, approximately 26 acres under the Proposed Project, and 11 acres under the Conceptual Strategy Alternative could be subject to indirect impacts because development would occur within 250 feet. Therefore, implementation of the Proposed Project and Conceptual Strategy Alternatives would result in **direct** and **indirect significant** impacts on Federally listed vernal pool invertebrates.

Western spadefoot was found on the Shalako property during surveys conducted in 1993 (Sugnet & Associates 1993). Implementation of the Proposed Project and Conceptual Strategy Alternatives would permanently remove approximately 16 acres and 15 acres, respectively, of vernal pool and other wetland habitat suitable for western spadefoot. Upland grassland habitat (approximately 1,040 acres under the Proposed Project and 934 acres under the Conceptual Strategy) used for aestivation would also be permanently lost because of development. In addition to the direct removal of potential habitat, the Proposed Project and Conceptual Strategy Alternatives are expected to have indirect impacts on potential habitat for western spadefoot through habitat modifications (see Impact 3.3-1 for a description of potential indirect impacts on vernal pools and other wetland habitats). Indirect impacts could also include mortality related to an increase in vehicular traffic on and near the project site, noise and vibration disturbance causing toads to break dormancy, and exposure to herbicides, pesticides, and other toxins. In addition, if present, western spadefoot could be killed during construction activities. Therefore, **direct** and **indirect** impacts on western spadefoot are potentially **significant**.

Valley Elderberry Longhorn Beetle

It is not known whether VELB occurs on the SPA, but because the site is within the range of the species and suitable habitat is present (i.e., an elderberry shrub), it is assumed that the species could be present. One elderberry shrub is present in the riparian habitat next to the stock pond near Kiefer Boulevard and would be removed with implementation of the Proposed Project or Conceptual Strategy Alternative. However, the loss of a single elderberry shrub would not have a substantial impact on the regional VELB population. Therefore, potential **direct** impacts to VELB from implementation of the Proposed Project and Conceptual Strategy Alternative are considered **less than significant**. **No indirect** impacts on VELB would occur.

Western Pond Turtle

Implementing the Proposed Project or Conceptual Strategy Alternatives would permanently remove approximately 2 acres of stock pond and associated upland annual grassland considered potential habitat for western pond turtle. If western pond turtles are present, draining and grading of suitable habitat during construction could strand or smother western pond turtles. Therefore, implementation of the Proposed Project and Conceptual Strategy Alternatives could result in **direct significant** impacts to western pond turtle. **No indirect** impacts would occur.

Swainson's Hawk and Other Raptors

Implementation of the Proposed Project and Conceptual Strategy Alternatives would remove approximately 1,040 acres and 934 acres, respectively, of annual grasslands that provides foraging habitat for Swainson's hawk and white-tailed kite and foraging and nesting habitat for burrowing owl and northern harrier. Trees that provide suitable nest sites for Swainson's hawk, white-tailed kite, and other raptors would also be removed. Implementing the Proposed Project or Conceptual Strategy Alternatives would not only remove foraging and nesting habitat, they would also fragment the remaining habitat in the vicinity of the SPA, which could cause the habitat to become unsuitable for foraging by some raptors. Large raptors generally require large areas of suitable foraging habitat and the loss and fragmentation of large tracts of foraging habitat can reduce local population numbers. Potential indirect impacts to burrowing owl include increased nest failure due to disruption of essential breeding and foraging behavior resulting from human disturbances in adjacent developed areas and increased nest predation by wildlife species associated with human development, such as crows and raccoons, as well as domestic cats and dogs. Thus, implementing the Proposed Project and Conceptual Strategy Alternatives could eventually lead to the permanent displacement of some raptors from the SPA. Therefore, the Proposed Project and Conceptual Strategy Alternatives would result in **direct** and **indirect significant** impacts to Swainson's hawk, western burrowing owl, northern harrier, white-tailed kite, and other raptors.

Grasshopper Sparrow and Loggerhead Shrike

Implementing the Proposed Project and Conceptual Strategy Alternatives would permanently remove 1,040 acres and 934 acres, respectively, of annual grassland that provides suitable nesting and foraging habitat for grasshopper sparrow and suitable foraging habitat for loggerhead shrike. Shrubs and trees that provide potential nesting habitat for loggerhead shrike would also be removed. Grassland habitat preserved on the SPA may no longer be suitable for these species because of disturbances from surrounding development. However, these species generally require smaller tracts of habitat relative to the raptors discussed above. Annual grassland habitat would remain relatively abundant in the region and loss of habitat from the SPA is not likely to result in a substantial decline in local population numbers. Therefore, **direct** and **indirect** impacts on loggerhead shrike and grasshopper sparrow under the Proposed Project and Conceptual Strategy Alternatives are considered **less than significant**.

American Badger

The 1,040 acres and 934 acres of dry, open annual grassland on the SPA, which would be permanently removed by implementing the Proposed Project and Conceptual Strategy Alternatives, respectively, is suitable habitat for American badger. American badger requires a large home range for survival, therefore, the removal of habitat and resulting fragmentation from implementing the Proposed Project and Conceptual Strategy Alternatives could result in indirect impacts to American badger through habitat modification. However, the loss of habitat from the SPA would not be likely to cause loss of individuals because there would still be adequate suitable foraging and denning habitat in the area to support the local population. Therefore, **direct** and **indirect** impacts to American badger under the Proposed Project and Conceptual Strategy Alternatives are considered **less than significant**.

Mitigation Measure: Implement Mitigation Measures 3.3-1a, 3.3-1b, 3.3-3a, and 3.3-3b.

Mitigation Measure 3.3-3c: Secure Take Authorization of Federally Listed Vernal Pool Invertebrates and Implement Permit Conditions, Develop and Implement a Habitat Mitigation and Monitoring Plan.

No project construction shall proceed in areas supporting potential habitat for Federally listed vernal pool invertebrates or within adequate buffer areas (250 feet or lesser distance deemed sufficiently protective by a qualified biologist with approval from USFWS) until a biological opinion (BO) and incidental take permit has been issued by USFWS and the project applicant has abided by conditions in the BO, including all conservation and minimization measures. A similar process shall be followed for future subsequent improvement plans and conservation and minimization measures for those phases shall also be implemented according to the BO. Conservation and minimization measures shall include preparation of supporting documentation describing methods to protect existing vernal pools during and after project construction, a detailed monitoring plan, and reporting requirements. Western spadefoot also requires the protection of vernal pool habitat for survival; therefore, implementation of Mitigation Measure 3.3-3c would also reduce impacts to western spadefoot.

The project applicants shall identify mitigation acceptable to the City, USACE, and USFWS for the impacts to vernal pools and other seasonal wetland habitats that support or potentially support Federally listed vernal pool invertebrates in such a manner that there will be no net loss of habitat (acreage and function) for these species following project implementation. As described under Mitigation Measure 3.3-1a, project applicants shall complete and implement a habitat MMP describing how loss of vernal pool and other wetland habitats shall be offset, including details for creating habitat; accounting for the temporal loss of habitat, performance standards to ensure success, and remedial actions to be implemented if performance standards are not met. Mitigation shall include, where feasible and practicable, preservation and or restoration of in-kind wetland habitats within the Mather Core Area at ratios satisfactory to ensure no net loss of habitat acreage, function, and value within the Mather Core Area.

The project applicants shall preserve acreage of vernal pool habitat for each wetted acre of any indirectly affected vernal pool habitat at a ratio approved by USFWS at the conclusion of the Section 7 consultation. This mitigation shall occur before the approval of any grading or improvement plans for any project phase that would allow work within 250 feet of such habitat, and before any ground-disturbing activity within 250 feet of the habitat. Unless otherwise agreed to by USFWS, vernal pool habitat within 250 feet of development will be considered indirectly affected. The project applicants will not be required to complete this mitigation measure for direct or indirect impacts that have already been mitigated to the satisfaction of USFWS through another BO or mitigation plan.

A standard set of BMPs shall be applied when working in areas within 250 feet of off-site vernal pool habitat or within any lesser distance deemed by a qualified biologist to constitute a sufficient buffer from such habitat with approval from USFWS. Refer to Section 3.9 “Hydrology and Water Quality” for the details of BMPs to be implemented.

Implementation: Project applicants for any particular discretionary development application requiring work within 250 feet of aquatic habitat.

Timing: Before the approval of any grading or improvement plans, before any ground-disturbing activities within 250 feet of vernal pool or other seasonal wetland habitat, and on an ongoing basis throughout construction as applicable for all project phases as required by the mitigation plan, biological opinion, and BMPs.

Enforcement: U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and City of Rancho Cordova Planning Department.

Mitigation Measure 3.3-3d: Obtain Incidental Take Permit for Impacts to Valley Elderberry Longhorn Beetle and Implement All Permit Conditions.

No project construction shall proceed in areas containing VELB habitat (i.e., elderberry shrubs) until a BO and an Incidental Take Permit have been issued by USFWS and the project applicant has abided by all pertinent conditions in the BO relating to the proposed construction, including all conservation and minimization measures. Conservation and minimization measures are likely to include preparation of supporting documentation describing methods for relocating the existing shrub. Relocation of existing elderberry shrubs and planting of new elderberry seedlings shall be implemented on a no-net-loss basis. Detailed information on monitoring success of relocated and planted shrubs, and measures to compensate should success criteria not be met, would also likely be required in the BO. Ratios for mitigation of VELB habitat will ultimately be determined through the Federal ESA Section 7 consultation process with USFWS, but shall be a minimum of “no net loss.”

Implementation: Project applicants of all project phases containing elderberry shrubs.

Timing: As required by the BO and prior to ground-disturbing activities that would remove elderberry shrubs.

Enforcement: U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and City of Rancho Cordova Planning Department.

Mitigation Measure 3.3-3e: Conduct Preconstruction Surveys to Avoid Western Pond Turtle.

A preconstruction survey for western pond turtle shall be conducted by a qualified biologist prior to work in suitable aquatic habitat. If no pond turtles are observed, no further mitigation is necessary.

If pond turtles are found, they shall be relocated by a qualified biologist to the nearest area with suitable aquatic habitat that will not be disturbed by project-related construction activities.

Implementation: Project applicants for any particular discretionary development application containing suitable aquatic habitat.

Timing: Before approval of grading or improvement plans or any ground disturbing activities, including grubbing or clearing, for any project phase affecting suitable aquatic habitat.

Enforcement: City of Rancho Cordova Planning Department.

BIM

Under the Biological Impact Minimization Alternative, adverse impacts on wetlands, other waters, and annual grassland that provide potential habitat for special-status wildlife species would be substantially less than under the Proposed Project Alternative. The wetland preserve under the Biological Impact Minimization Alternative would be approximately 411 acres and would incorporate a comprehensive array of wetland complexes on the SPA. The wetland preserve would be almost double the size of the Proposed Project Alternative wetland preserve network. Indirect effects on vernal pool species would also be less because the Biological Impact Minimization Alternative generally provides larger buffer areas around preserved wetlands than the Proposed Project Alternative, leaves more vernal pool systems intact, and preserves larger, more contiguous habitat patches. Under this alternative, road crossings throughout the preserve would be eliminated. The Biological Impact Minimization Alternative would preserve approximately 200 more acres of suitable foraging habitat for Swainson's hawk and other raptors, nesting habitat for burrowing owl, and northern harrier, and habitat for American badger. However, permanent loss of habitat for all of these species, as well as habitat for western pond turtle, would still occur and direct take of individuals could occur, as a result of implementing this alternative. Indirect effects to these species would still occur as a result of habitat fragmentation and development in uplands adjacent to wetland habitats, including alteration of the topography and hydrologic function, increased runoff from adjacent impervious surfaces, and degraded water quality from contaminants. The elderberry shrub that provides potentially suitable habitat for VELB would be removed; however, the loss of a single elderberry shrub would not have a substantial impact on the regional VELB population. Therefore, **direct** and **indirect significant** impacts to Swainson's hawk, burrowing owl, northern harrier and other raptors, and western pond turtle would occur, but to a lesser extent compared to the Proposed Project Alternative. ***[Lesser]*** **Direct** and **indirect** impacts on grasshopper sparrow, loggerhead shrike, VELB, and American badger would be **less than significant** under the Biological Impact Minimization Alternative. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.3-1a, 3.3-1b, 3.3-3a, 3.3-3b, 3.3-3c, 3.3-3d, and 3.3-3e.

Impacts on special-status wildlife associated with grasslands, vernal pools, and other seasonal wetlands would be increased under the Increased Development Alternative relative to the Proposed Project Alternative. The size of the wetland preserve under the Increased Development Alternative would be reduced to approximately 97 acres, as opposed to 204 acres under the Proposed Project Alternative. The total acreage of vernal pools and other wetlands lost under the Increased Development Alternative would also increase from approximately 19 acres under the Proposed Project Alternative, to approximately 26 acres under the Increased Development Alternative. Direct and indirect impacts on Federally listed vernal pool invertebrates and western spadefoot would be increased under the Increased Development Alternative because land designated for residential or other land uses would be expanded. The 97-acre preserve proposed under this alternative would result in a fragmented vernal pool landscape that would be completely isolated from vernal pool grasslands to the east of the project site. The amount of foraging habitat for Swainson's hawk and other raptors and nesting habitat for burrowing owl removed would increase substantially under this alternative with an additional 107 acres being converted to development, compared to the Proposed Project Alternative. Because the size of the habitat preserve areas would be smaller, it is less likely that remaining grassland habitat would be suitable for raptors or for northern harrier and loggerhead shrike. Under this alternative, the ponds that provide potentially suitable habitat for western pond turtle would still be removed. A greater amount of suitable habitat for American badger would be removed under the Increased Development Alternative than under the other action alternatives, but the impact would remain less than significant because the loss of habitat from the SPA would not be likely to cause loss of individuals because there would still be adequate suitable foraging and denning habitat in the area to support the local population. The elderberry shrub that provides potentially suitable habitat for VELB would be removed; however, the loss of a single elderberry shrub would not have a substantial impact on the regional VELB population. Therefore, **significant direct** and **indirect** impacts on Swainson's hawk and other raptors, loggerhead shrike, burrowing owl, northern harrier, grasshopper sparrow, and western pond turtle would occur under the Increased Development Alternative and to a greater extent than under the Proposed Project. ***[Greater]*** **Direct** and **indirect** impacts on American badger and VELB would be **less than significant** under the Increased Development Alternative. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.3-1a, 3.3-1b, 3.3-3a, 3.3-3b, 3.3-3c, 3.3-3d, and 3.3-3e.

Impact 3.3-3 related to VELB is less than significant before mitigation. However, implementing Mitigation Measure 3.3-3d would further reduce impacts on VELB under the No USACE Permit, Proposed Project, Biological Impact Minimization, Agency Conceptual Strategy, and Increased Development Alternatives because it would require that the one elderberry shrub present on the site that would be removed as a result of project implementation would be replaced on a no-net-loss basis to maintain habitat for breeding populations in the region.

Implementing Mitigation Measures 3.3-1a, 3.3-1b, and 3.3-3c would reduce significant impacts on western spadefoot to a **less-than-significant** level under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives because it would ensure that wetland habitat removed from the SPA would be replaced on a no net loss basis and requires measures to minimize adverse effects on water quality and wetland hydrology that could indirectly affect western spadefoot.

Implementing Mitigation Measure 3.3-3e would reduce significant impacts on western pond turtle to a **less-than-significant** level under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives because it would ensure that no pond turtles are killed as a direct result of implementing the project.

In summary, implementing the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives would result in direct significant impacts on Federally listed vernal pool invertebrates, Swainson's hawk, and western spadefoot. Implementing the No USACE Permit Alternative would result in direct and indirect significant impacts on Swainson's hawks and indirect significant impacts on Federally listed vernal pool invertebrates, western spadefoot, and western pond turtle. Implementation of Mitigation Measures 3.3-1a, 3.3-1b, 3.3-3a, 3.3-3b, and 3.3-3c would lessen direct and indirect significant impacts on special-status wildlife resulting from the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives; however, this impact would remain **significant and unavoidable,** except where noted for western spadefoot, VELB, and western pond turtle, because the removal of between approximately 650 acres (under the No USACE Permit Alternative) and 1,170 acres (under the Increased Development Alternative) of potential habitat for special-status wildlife and the indirect effects and associated fragmentation of surrounding potentially suitable habitat cannot be fully mitigated. Indirect impacts under the No USACE Permit Alternative would be reduced by implementing Mitigation Measure 3.3-1a because it requires measures to minimize adverse effects on water quality and wetland hydrology; however, indirect impacts would remain significant and unavoidable due to habitat fragmentation and edge effects, similar to the other action alternatives. The amount of grassland habitat lost could potentially contribute to the decline of Swainson's hawk populations in the region. This decline would constitute a substantial adverse effect under CEQA. Furthermore, the loss of between 10 and 26 acres of vernal pool fairy shrimp and vernal pool tadpole shrimp habitat and the habitat fragmentation that would occur under the Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives could potentially contribute to the decline of listed vernal pool invertebrate populations in the region, especially considering that the SPA is within an area identified by USFWS as crucial to the recovery of these species (USFWS 2005) and considering the rate of habitat destruction in the region. However, the development under any of the Alternatives in and of themselves would not be expected to cause a decline in numbers of any of these species to the point where their regional populations are no longer viable.

Impacts to special-status wildlife species could only be fully mitigated through a combination of habitat preservation and restoration in the vicinity of the SPA. While parcels of similar habitat quality are currently present in the project vicinity, these parcels would be of lower value following development of the project because of the effects of habitat fragmentation and secondary impacts related to the project. Moreover, there would be a net loss of between 650 and 1,170 acres (1,062 acres under the Proposed Project Alternative) of vernal pool grassland regardless of the acreage preserved if any of the action alternatives are implemented and there is not sufficient undeveloped land in the Mather Core Area or the project vicinity to offset the effects of habitat fragmentation on special-status species, and thus, fully mitigate the impact or reduce it to a less-than-significant level.

IMPACT 3.3-4 **Potential for Substantial Interference with the Movement of any Native Resident or Migratory Wildlife Species or with Established Native Resident or Migratory Wildlife Corridors, or Impede the use of Native Wildlife Nursery Sites.** *Project implementation could interfere with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors.*

NP

Because no development would occur under the No Project Alternative, there would be no project-related activities that would affect wildlife movement. There are no native wildlife nursery sites in the SPA. Therefore, **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP, PP, BIM, CS

Wildlife corridors are features that provide connections between two or more areas of habitat that would otherwise be isolated and unusable. Often drainages, creeks, or riparian areas are used by wildlife as movement corridors as these features can provide cover and access across a landscape. Kite Creek flows southwesterly across the SPA. It is unknown the extent to which this creek corridor is used by wildlife in the area for movement, but the SPA is situated between the Anatolia Preserve (located north of the Shalako property and west of the

Kamilos property) and open areas to the north, east, and south that provide habitat for numerous common and special-status wildlife species associated with vernal pool grasslands. Therefore, it is likely that the creek corridor and the overall SPA are used extensively for wildlife movement. Since development is planned to the north, northeast, and south of the SPA, the SPA and its creek corridor provide a vital link to vernal pool grassland habitats to the east and to existing and proposed habitat preserve areas to the north, west, and south. The creek may serve as a dispersal corridor for vernal pool tadpole shrimp between vernal pool systems and provides opportunities for genetic exchange important to maintaining healthy populations of this species. However, the No USACE Permit, Proposed Project, Biological Impact Minimization, and Conceptual Strategy Alternatives each include preservation of an open space corridor along Kite Creek that would provide habitat linkage across the SPA between planned habitat preserve areas to the south and existing open space to the east, including habitat preserve areas in the Kiefer Buffer Lands. Regionally common wildlife species, such as coyote, fox, raccoon, skunk, possum, are expected to continue to use the Kite Creek corridor after project implementation and Kite Creek would continue to provide dispersal opportunities for vernal pool tadpole shrimp and other special-status species after implementing any of these project alternatives. Furthermore, the SPA is not known to contain an established wildlife movement corridor that is vital for the movement of any resident or migratory fish or wildlife species or population and there are no native wildlife nursery sites in the SPA. Therefore, **direct** and **indirect** impacts on wildlife movement from the No USACE Permit, Proposed Project, Biological Impact Minimization, and Conceptual Strategy Alternatives are considered **less than significant**. ***[Similar]***

ID

Under the Increased Development Alternative, a very narrow corridor would be preserved along a portion of Kite Creek within the SPA, but this preserved corridor would not link to natural habitat areas off site, except to the planned habitat preserve area to the south of the Shalako property. Therefore, implementing the Increased Development Alternative would eliminate habitat connectivity across the SPA between existing vernal pool grasslands to the east of the project and the vernal pool preserve planned as part of the Arboretum project to the south. Therefore, implementing this alternative would lower the value of the planned Arboretum preserve and limit the flow of genetic exchange between existing habitat patches adjacent to the project site. Furthermore, because the corridor proposed for habitat preservation under this alternative is extremely narrow (ranging from approximately 100 to 500 feet in width), habitat quality would be seriously diminished in this corridor and the corridor would not provide secure movement opportunities for many species following development. Furthermore, because the Increased Development Alternative would provide a partial habitat corridor that would allow wildlife to move from natural habitat areas to the south into the SPA, but provides no outlet to other habitat patches outside the SPA, this corridor could be detrimental to wildlife that would be routed to developed areas through this corridor rather than to other natural habitat areas. Therefore, implementing the Increased Development Alternative would virtually eliminate wildlife movement opportunities through the SPA for both common and special-status species, whereas every other alternative would provide a contiguous movement corridor across the SPA between natural habitats planned for preservation into the foreseeable future. Therefore, **direct** and **indirect** impacts on wildlife movement would be **significant**. ***[Greater]***

Mitigation Measure: No feasible mitigation measures are available.

There are no feasible mitigation measures available that would increase wildlife movement opportunities other than redesigning the Increased Development Alternative. Because this DEIR/DEIS already includes four other land use alternatives that have been designed to provide opportunities for wildlife movement, redesigning the Increased Development Alternative is not considered feasible. (The reader should note that, as described in Chapter 1, “Introduction” and Chapter 2, “Alternatives,” the Increased Development Alternative was the original proposal for development of the project site. The need for additional wildlife connectivity was one of the reasons that the Proposed Project Alternative was designed in its current form.) The lack of wildlife connectivity is considered a significant and unavoidable impact under the Increased Development Alternative.

IMPACT 3.3-5 **Substantial Reduction in the Habitat of a Wildlife Species.** *Implementing the project would substantially reduce the habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp habitat.*

NP

Under the No Project Alternative no development would occur and there would be no project-related ground-disturbing activities that would affect wetland habitats suitable for vernal pool fairy shrimp and vernal pool tadpole shrimp. Therefore, **no direct** or **indirect impact** would occur under the No Project Alternative. ***[Lesser]***

NCP

The No USACE Permit Alternative would not result in fill of wetlands or other waters subject to USACE jurisdiction under the CWA, therefore habitat suitable for vernal pool fairy shrimp or vernal pool tadpole shrimp would not be removed from the SPA. No development would occur within 50 feet of wetland features and free spanning bridges would be constructed wherever roadways cross waters to avoid impacts on these waters. Mixed use development would still be constructed adjacent to aquatic resources resulting in topographic modifications, creation of impervious surfaces, urban runoff, erosion, and siltation; intrusion of humans and domestic animals; and introduction of invasive plant species that could result in habitat degradation. In some cases, this degradation could render the habitat unsuitable for vernal pool branchiopods. Under the No USACE Permit Alternative, 26 acres of suitable wetland habitat in the SPA and 2 acres of off-site suitable wetland habitat within 250 feet of proposed project development could be indirectly affected by project implementation. Therefore, there would be **no direct** impact and a **significant indirect** impact related to habitat loss. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.3-1b.

PP, CS, ID

Under the Proposed Project Alternative, 20 acres of suitable habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp would be permanently lost. This is a substantial reduction in the habitat of these species because it represents 55% of the suitable habitat for these species in the SPA and the SPA is within an area identified as being crucial not only to the recovery of these species, but also to the long-term survival of vernal pool tadpole shrimp (i.e., the Mather Core Area). Habitat loss under the Conceptual Strategy would be similar with 52%, or 19 acres, of existing habitat for these species being removed from the SPA. Under the Increased Development Alternative, 76% of the existing habitat for these species would be removed from the SPA. The largest concentration of extant vernal pool tadpole shrimp occurrences is in Sacramento County, and the majority of these occurrences is within the Mather Core Area. Because of the significance of the core area habitats, a loss of this magnitude from any SPA within the Mather Core Area would be considered a substantial reduction in the species' habitat. The project includes wetland buffer areas; however, habitat retained in the SPA could still become degraded from the indirect impacts of surrounding urbanization (see Impact 3.3 for a discussion of indirect impacts). In some cases, this degradation could render the habitat unsuitable for vernal pool branchiopods. Under the Proposed Project Alternative, 13 acres of suitable wetland habitat in the SPA and 13 acres of off-site suitable wetland habitat within 250 feet could be indirectly affected by project development. Implementing the Conceptual Strategy Alternative could result in indirect impacts to 10 acres of on-site habitat and 13 acres of off-site habitat that is within 250 feet of proposed development. Under the Increased Development Alternative, 8 acres of on-site habitat and 14 acres of off-site habitat could be subject to indirect impacts from project development because it is within 250 feet of proposed development. Therefore, **direct** and **indirect** impacts to wildlife habitat would be **significant**. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.3-1a, 3.3-1b, and 3.3-3a.

Implementing Mitigation Measures 3.3-1a, 3.3-1b, and 3.3-3a would lessen the significant impact of substantial loss in habitat for vernal fairy shrimp and vernal pool tadpole shrimp, but not to a less-than-significant level. Mitigation Measures 3.3-1a and 3.3-3a would require that aquatic habitat lost or degraded by implementing the project would be replaced according to USACE's and USFWS's no-net-loss standards. However, the only way to ensure no net loss of habitat acreage is to create aquatic habitats to replace those that would be filled. While created habitats can compensate for the loss of wetted habitat acreage, they cannot be guaranteed to replace the full spectrum of habitat functions and the value of the habitat lost. It is not known if aquatic habitats that might be created to compensate for project losses would support self-sustaining populations of vernal pool tadpole shrimp and vernal pool fairy shrimp and preservation of existing habitats at any ratio would still result in a net loss of habitat for these species. Furthermore, it is unlikely that habitat compensation can be accomplished within the Mather Core Area and mitigation outside of the Mather Core Area cannot fully compensate for the loss of habitat within the core area in terms of its value to vernal pool tadpole shrimp. Habitat within the Mather Core Area is considered vital to preventing the extinction or irreversible decline of vernal pool fairy shrimp and vernal pool tadpole shrimp. At the time this document was prepared, the rate of compensatory mitigation provided within the core area for CWA permits issued to projects removing vernal pool habitat from the core area was approximately 50% (i.e., for every 1 acre of wetland habitat removed, 0.5 acre of habitat was mitigated in the core area) and the amount of undeveloped, unspoken-for land within the Mather Core Area that could potentially be preserved is running out. Moreover, habitat that is preserved on the SPA and other project preserves in the vicinity would ultimately be of lower value following development because of the effects of habitat fragmentation.

Therefore, fully compensating for project impacts by preserving existing habitat in the project vicinity and within the Mather Core Area is infeasible and no feasible mitigation exists to reduce this impact to a less-than-significant level. This impact would remain **significant and unavoidable**.

BIM

Under the Biological Minimization Alternative 33%, or 12 acres, of existing habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp would be removed from the SPA. Any loss of habitat from the Mather Core Area would be a significant impact, as discussed under Impact 3.3-3; however, because the Biological Impact Minimization Alternative would preserve the majority (67%) of existing habitat for these species in the SPA, this alternative would not result in a substantial reduction in habitat for these species. Therefore, there would be a **less-than-significant direct** and **indirect** impact from loss of wildlife habitat. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

3.3.4 RESIDUAL SIGNIFICANT IMPACTS

Although impacts on some biological resources (i.e., streambed and pond habitats regulated by DFG, western spadefoot, western pond turtle, and special-status plants), would be reduced to less-than significant levels through implementation of the mitigation measures described in this section, direct and indirect impacts on jurisdictional waters of the U.S. including wetlands (with the exception of the No USACE Permit Alternative, which would only have indirect impacts), special-status wildlife species (vernal pool invertebrates and Swainson's hawk); and the substantial reduction in habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp (a mandatory finding of significance under CEQA) would remain significant and unavoidable even with implementation of the mitigation measures listed herein because the project would contribute substantially to the regional loss of these resources and habitat fragmentation and permanent loss/displacement of these special-status wildlife species would result and there are no feasible mitigation measures to fully reduce this impact to a less-than-significant level. Furthermore, it is unlikely that land suitable for restoration or creation of wetlands to replace those lost from the SPA would be available within the Mather Core Area, which is vital to preventing the extinction or irreversible decline of vernal pool fairy shrimp and vernal pool tadpole shrimp. If existing, functional, compensatory wetlands were not available from a mitigation bank at the time of project implementation, then there would be a temporal loss of habitat function until performance standards and success criteria of created wetlands are met. The reduction in habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp would be less than significant under the Biological Impact Minimization Alternative, but would be significant and unavoidable under every other action alternative.

3.3.5 CUMULATIVE IMPACTS

The geographic extent of cumulative impacts on biological resources is based on the extent of the Laguna Creek and Morrison Creek watersheds, which include the SPA. Under the Proposed Project Alternative, there are approximately 35 acres of existing vernal pools and other seasonal wetlands considered habitat for special-status vernal pool invertebrates. Of these, 53% (19 acres) would be permanently destroyed by implementing the Proposed Project Alternative. The Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives would remove roughly 10, 17, and 26 acres of existing wetlands (or 30%, 49%, and 75%), respectively. All past, present, and reasonably foreseeable future projects in the City of Rancho Cordova and within the Laguna Formation would result in a cumulative loss of approximately 53% (111 acres) of existing vernal pools, based on acreage calculations provided by the City of Rancho Cordova (Angell, pers. comm. 2005). The proposed project would contribute to the cumulative loss of approximately 8% of the vernal pools within the Laguna Formation. In addition to the direct loss of habitat, implementing the project in conjunction with the existing plans in the surrounding area would result in the fragmentation of the regional vernal pool resources of the Laguna Formation and the Morrison Creek and Laguna Creek watersheds. Therefore, vernal pools and other wetlands would be confined to a small geographic region and would be more vulnerable to the effect of habitat fragmentation and other indirect impacts.

Implementing the project would also result in the permanent removal of between 3 acres, under the Biological Impact Minimization Alternative, and 4 acres, under the Proposed Project Alternative, of other waters consisting of ephemeral and intermittent drainage channels and ponds.

Implementing the project would result in the loss of between 659 acres and 1,147 acres of annual grassland habitat, which serves as foraging habitat for raptors including Swainson's hawk. This loss would contribute significantly to the regional loss of this biological resource.

In addition to the related projects considered for all resource areas in this EIR/EIS as described in Section 3.0, the projects identified in Table 3.3-6 below are also considered in the cumulative analysis for biological resources because the USACE has specifically requested an additional level of detailed cumulative analysis related to biological resources that includes a variety of additional projects to determine cumulative impacts on wetlands and waters of the U.S.

The geographic extent of impacts on annual grassland, wetlands (e.g., vernal pools, swales, and seasonal wetlands) and other waters of the United States (e.g., ephemeral and intermittent drainage channels), and the biological resources associated with these habitats consists of the Morrison Creek and Laguna Creek watersheds. General discussion of overall losses of these resources is also included for Sacramento County and the Southeastern Sacramento Valley Vernal Pool Region.

Many projects near the SPA have been constructed recently or are in various stages of planning and entitlement (see Exhibit 3.0-1 in Section 3.0, "Approach to the Environmental Analysis and the Cumulative Context"). Some have already resulted in fill of wetlands and other waters of the U.S. and loss of wetland functions. Based on the data currently available and presented in Table 3.3-6, cumulative losses of wetlands and other waters of the U.S., including vernal pools, for specific projects within the Morrison Creek and Laguna Creek watersheds and surrounding areas of Sacramento County have been and are expected to be substantial. Thus, related projects throughout the region would result in a cumulatively significant impact to wetlands and other biological resources associated with these habitats. Project implementation would result in a cumulatively considerable incremental contribution to this cumulatively significant impact of regional loss because of the large acreage of habitats that would be lost as a result. In addition, road improvements and roadway construction within the City's planning

Table 3.3-6
Wetlands and Other Waters at Specific Projects in the Vicinity of the SunCreek Specific Plan

Project in Sacramento County	Total Waters of the U.S. (Approximate)	Acres of Waters of the U.S. Filled (Approximate)
Anatolia I, II, III, IV	86.43	44.29
Arboretum	116.86	31.75
Arista del Sol	17.41	13.88
Capital Village	None	None
Cordova Hills	103.67	39.4
Creekview Manor	25.90	7.72
DeSilva-Gates Quarry	NA	NA
Douglas 98	3.91	3.91
Douglas 103	5.40	1.98
Excelsior Estates	39.81	28.77
Florin-Vineyard Gap	33.46	22.9
Folsom South of U.S. 50	84.94	40.75
Glenborough at Easton and Easton Place	22.90	4.93
Grantline 208	11.19	No net loss
Heritage Falls	6.85	6.85
Mather East	2.68	0.19
Mather Specific Plan	198.5	40.3
Montelena	16.66	10.605
Newbridge (Rendering Plant)	22.23	10
North Douglas	5.36	6.17
North Douglas II	4.42	0.627
North Vineyard Station Drainage Master Plan	18.10	15.48
Rio del Oro	56.63	27.9
Sunridge Lot J	2.99	2.99
Sunridge Park	1.99	1.81
The Ranch at Sunridge	21.42	10.24
Teichert Quarry	7.41	3.63
Triangle Rock Expansion Project	11.03	9.1
Villages of Zinfandel	1.15	1.15
Vineyard Springs	53.34	16.07
Stoneridge Quarry	42.9	10.54
Westborough	2.49	2.5
Total (Approximate)	**945.3**	**403.72**

Notes: NA = Not Available
Sources: Data provided by City of Rancho Cordova, USACE, and ECORP in 2010 and 2011

area are estimated to result in direct impacts on an additional 25 acres of vernal pool and other wetland habitats that are not included in Table 3.3-6. These impacts were analyzed at a program level in the City General Plan Draft EIR (City of Rancho Cordova 2006), and mitigation for these impacts is included in the Natural Resources Element of the General Plan.

The project would result in degradation of wildlife habitat by developing new facilities that, when combined with other habitat impacts occurring from development within the region, would result in significant cumulative impacts. Despite the implementation of project-specific biological resource mitigation measures identified above, a temporal loss of wetlands and other waters of the U.S. would occur during mitigation implementation until performance standards and success criteria are met.

It is estimated that 75% to 90% of the historic California vernal pool habitat has been lost. Results of surveys of vernal pool distribution in the Central Valley indicate that 13% of the 1,032,853 acres of vernal pool habitat mapped in 1997 was gone by 2005 (Holland 2009). Losses of vernal pool habitat in the project region in that time period were substantial, with Sacramento County losing approximately 6,550 acres and El Dorado County losing approximately 260 acres. In the period between 1994 and 2005, Placer County lost approximately 17,115 acres of vernal pool habitat (Holland 2009). In Sacramento County, two large new growth areas—Jackson Highway New Growth Area and Grant Line East New Growth Area—are planned for major urbanization between now and 2030. These two new growth areas support a combined 316 wetted acres of vernal pools that could be converted to urban land uses by the year 2030 (Sacramento County 2009). Full buildout of the City of Rancho Cordova General Plan planning area is projected to convert up to 20,728 acres of vernal pool grasslands containing 630 wetted acres of vernal pools. Historic losses of vernal pool habitat in combination with projected losses from existing, proposed, planned, and approved projects constitute a cumulatively substantial reduction in vernal pool habitat in the region. Habitat losses of this magnitude have a substantial adverse effect on species that rely on this habitat type, including Federally-listed vernal pool crustaceans, and contribute to the decline of these species.

Direct and indirect habitat loss resulting from implementation of the project, would have a cumulatively considerable incremental contribution to the regional loss of the habitat types presented in Table 3.3-7. Therefore, project implementation would result in a cumulatively considerable incremental contribution to the decline of these species in the region. In addition, the project, when combined with surrounding planned projects, would result in the conversion of large, open habitat landscapes surrounded by other open space to smaller patches of habitat surrounded by urban development. Therefore, aquatic habitats would be confined to small geographic locations and would be more vulnerable to the effect of habitat fragmentation and other indirect impacts.

Considering the rate of development in Sacramento County and, specifically within the Morrison and Laguna Creek watersheds, and the limited amount of undeveloped, unspoken for land that supports existing wetlands that could be preserved, or that is suitable for creation of compensatory aquatic habitats similar to those that would be removed as a result of implementing the project, it may not be possible to fully mitigate the loss of habitat functions and values provided by the aquatic habitats that would be lost in the SPA.

Project implementation would also result in the loss of between 659 acres and 1,147 acres of annual grassland habitat, which serves as foraging habitat for raptors, including Swainson’s hawk, and other grassland associated wildlife species, and nesting habitat for burrowing owl. Therefore, the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact from regional loss of this biological resource. Implementation of Mitigation Measure 3.3-4 would reduce the direct project-specific impacts on Ahart’s dwarf rush and other special-status plant species to a less-than-significant level and implementing Mitigation Measure 3.3-3d would further reduce the less-than-significant VELB impacts. Implementation of Mitigation Measures 3.3-1b, 3.3-2, 3.3-3a, 3.3-3b, 3.3-3c, and 3.3-3e would reduce but not fully eliminate other project-specific significant impacts to biological resources. Even with implementation of the proposed mitigation and regional enforcement of the USACE “no net loss” standard, the project would contribute substantially to the diminished value of the region as it relates to the long-term viability of these resources. The SunCreek project would result in a cumulatively considerable incremental contribution to significant cumulative biological resources impacts including the loss and degradation of sensitive habitats, habitat for special-status wildlife, and habitat for special-status plants; and loss/displacement of special-status wildlife.

Table 3.3-7
Special-Status Species Supported By the Habitat Types to Which the Project Would Contribute a Cumulatively Considerable Incremental Loss

Habitat Type	Special-Status Species Supported
Vernal Pools, Seasonal Wetlands, and Swales	Dwarf downingia Bogg's Lake hedge-hyssop Ahart's dwarf rush Greene's legenere Pincushion navarretia Slender Orcutt grass Sacramento Orcutt grass Vernal pool fairy shrimp Vernal pool tadpole shrimp Western spadefoot Northwestern pond turtle
Annual Grassland	Swainson's hawk White-tailed kite Tricolored blackbird Grasshopper sparrow Burrowing owl Northern harrier Loggerhead shrike American badger

Source: Data provided by AECOM in 2010

3.4 CLIMATE CHANGE

Emissions of greenhouse gases (GHGs) have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. The proper context for addressing this issue in an EIR/EIS is within an assessment of cumulative impacts, because although it is unlikely that a single project will contribute significantly to climate change, cumulative emissions from many projects could impact global GHG concentrations and the climate system.

Global climate change also has the potential to result in sea level rise (resulting in flooding of low-lying areas), to affect rainfall and snowfall (leading to changes in water supply), to affect temperatures and habitats (affecting biological resources), and to result in many other adverse effects.

3.4.1 GREENHOUSE GAS EMISSIONS AND CONTRIBUTION TO GLOBAL CLIMATE CHANGE

INTRODUCTION

Cumulative impacts are the collective impacts of one or more past, present, and future projects that, when combined, result in adverse changes to the environment. In determining the significance of a proposed project's contribution to anticipated adverse future conditions, a lead agency should generally undertake a two-step analysis. The first question is whether the *combined* effects from *both* the proposed project *and* other projects would be cumulatively significant. If the agency answers this inquiry in the affirmative, the second question is whether "the proposed project's *incremental* effects are cumulatively considerable" and thus significant in and of themselves.

Legislation and executive orders on the subject of climate change in California have established a statewide context and process for developing an enforceable cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that lead agencies consider evaluating the cumulative impacts of GHGs. The contributions of project-generated GHG emissions to this cumulative impact (from which significant effects are occurring and are expected to worsen over time) may be potentially significant.

The cumulative global climate change analysis presented in this section of the EIR/EIS includes two subsections: 3.4.1 and 3.4.2. Subsection 3.4.1 contains a discussion of existing climate conditions, the current state of climate change science, and GHG emissions sources in California, as well as a summary of applicable regulations. Next, a description of GHG emissions generated by the Proposed Project and the other four action alternatives, and their contribution to global climate change, is presented. In Subsection 3.4.2, the potential effects of global climate change are identified based on available scientific data, and their potential effects on the project are evaluated to the extent possible based on the quality of the data. Regardless of which of the alternatives were implemented, the impacts of global change on the project would be substantially similar. Consequently, the format of Subsection 3.4.2 is altered in comparison to the other sections in Chapter 3.

AFFECTED ENVIRONMENT

Existing Climate

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place (Ahrens 2003). The SPA is located in a climatic zone characterized as dry-summer subtropical or Mediterranean (abbreviated Cs) on the Köppen climate classification system. The Köppen system's classifications are primarily based on annual and monthly averages of temperature and precipitation.

The Sacramento Valley Air Basin (SVAB) is relatively flat, bordered by mountains to the east, west, and north. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin River Delta, bringing with it pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters.

Periods of dense and persistent low-level fog that are most prevalent between storms are characteristic of SVAB winter weather. The average winter temperature is a moderate 49 degrees Fahrenheit (°F). Most precipitation in the area results from air masses that move in from the Pacific Ocean from the west or northwest during the winter rainy season (November–April). During the summer, daily temperatures range from 50°F to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature.

The local meteorology of the SPA is represented by measurements recorded at the Sacramento 5 ESE station, near California State University, (CSU), Sacramento. The normal annual precipitation, which occurs primarily from November through April, is approximately 18 inches (Western Regional Climate Center [WRCC] 2010a). January temperatures range from an average minimum of 40°F to an average maximum of 53°F. July temperatures range from an average minimum of 59°F to an average maximum of 92°F (WRCC 2010a). The predominant wind direction and speed is from the south-southwest at approximately 8 miles per hour (mph) (WRCC 2010b; National Climatic Data Center [NCDC] 2010).

Attributing Climate Change—The Physical Scientific Basis Certain gases in the earth's atmosphere, classified as GHGs play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. The radiation absorbed by the earth is re-radiated, not as high-frequency solar radiation, but lower 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 (longer wavelength) radiation. Most solar radiation passes through GHGs; however, infrared radiation is selectively absorbed by GHGs. As a result, infrared radiation released from the earth 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. Without the greenhouse effect, Earth would not be able to support life as we know it.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and high global warming potential (high-GWP) GHGs. High-GWP GHGs include ozone depleting substances (ODSs), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons, in addition to their replacements, hydrofluorocarbons (HFCs). Other high-GWP GHGs include perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Anthropogenic (i.e., caused by humans) emissions of these GHGs leading to atmospheric levels in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (United Nations Intergovernmental Panel on Climate Change [IPCC] 2007:665). Carbon dioxide emissions associated with fossil fuel combustion are the primary contributors to human-induced climate change (EPA 2010a). Following CO_2, CH_4 and N_2O emissions associated with human activities are the next largest contributors to climate change (IPCC 2007:135; U.S. Environmental Protection Agency [EPA] 2010b:ES-4–ES-10).

Climate change is a global problem because GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TACs), 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 year to several thousand years). GHGs persist in the atmosphere for a long enough time to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule depends on multiple variables and cannot be pinpointed, more CO_2 is currently emitted into the atmosphere than is sequestered. Carbon dioxide sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through photosynthesis and dissolution, respectively. These are two of the most common processes of CO_2 sequestration. Of the total annual human-caused CO_2 emissions, approximately 54% is sequestered through ocean uptake, northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46% of human-caused CO_2 emissions remain stored in the atmosphere (Seinfeld and Pandis 1998:1091).

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

Attributing Climate Change—Greenhouse Gas Emissions 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 [ARB] 2010a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (ARB 2010a).

Emissions of CO_2 are byproducts of fossil fuel combustion. Methane, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. Nitrous oxide is also largely attributable to agricultural practices and soil management. Carbon dioxide 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.

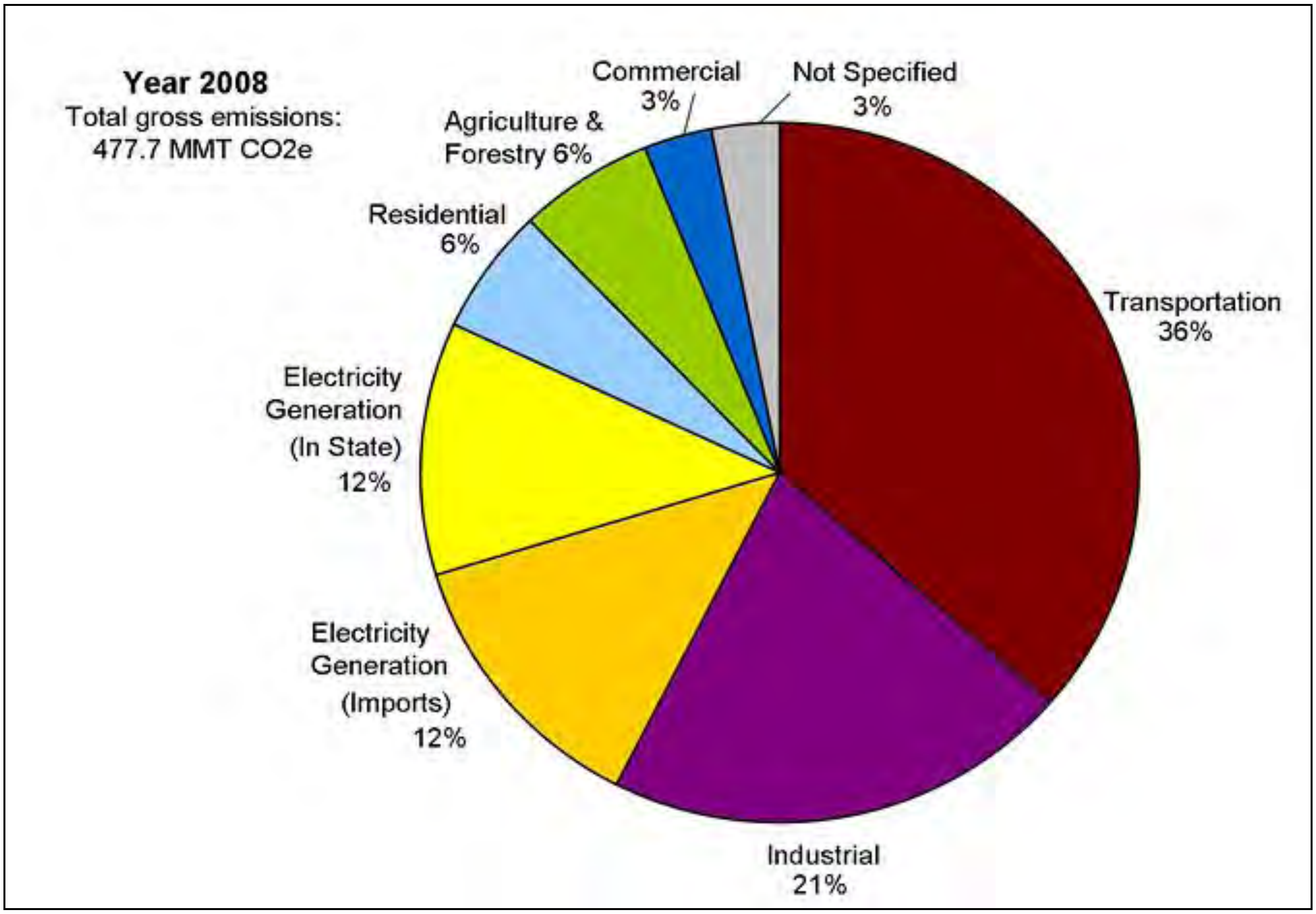
Land use decisions and development projects are not themselves GHG emissions sectors. In other words, land use development projects can generate GHG emissions from several sectors (e.g., transportation, electricity, and waste), as described in more detail below. Land use decisions and development projects can affect the generation of GHG emissions from multiple sectors that result from their implementation. Development projects can result in direct or indirect GHG emissions that would occur on- or off-site. For example, electricity consumed in structures within a project would indirectly cause GHGs to be emitted at a utility provider. The residents of, and the visitors to a development project would drive vehicles that generate off-site GHG emissions, which are associated with the transportation sector. The following sections describe the major GHG emission sectors and their associated emissions at the state and local level.

State Greenhouse Gas Emissions Inventory

As the second largest emitter of GHG emissions in the United States and twelfth to sixteenth largest in the world, California contributes a significant quantity of GHGs to the atmosphere (CEC 2006b:i). Emissions of CO_2 are byproducts of fossil-fuel combustion and are attributable in large part to human activities associated with the transportation, industry/manufacturing, electricity and natural gas consumption, and agriculture (ARB 2010a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (ARB 2010a) (see Exhibit 3.4.1-1, below).

GHGs with lower emissions rates than CO_2 may still contribute to climate change because they are more effective at absorbing outgoing infrared radiation than CO_2. The concept of CO_2 equivalency (CO_2e) is used to account for the different potentials of GHGs to absorb infrared radiation. This potential, known as the GWP of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.

Emissions of CH_4 and N_2O are generally much lower than those of CO_2, and are associated with anaerobic microbial activity resulting from agricultural practices, flooded soils, and landfills. These two compounds, CH_4 and N_2O, have approximately 23 and 296 times the GWP of CO_2, respectively.



Source: ARB 2010a

2008 California GHG Emissions by Sector (2000–2008 Emissions Inventory) Exhibit 3.4-1

Local Inventory

A GHG emissions inventory was conducted for each incorporated city in Sacramento County, including the City of Rancho Cordova (City), and the unincorporated area of Sacramento County (County) for the year 2009 (ICF Jones & Stokes 2009). The City's communitywide GHG Emissions totaled approximately 557,943 metric tons of CO_2e in 2005, or about 4% of the GHG emissions generated in Sacramento County. On-road transportation emissions accounted for 45% of the City's GHG emissions, followed by 24% from commercial/industrial land uses, and 17% from residential uses (ICF Jones & Stokes 2009).

REGULATORY FRAMEWORK

Numerous Federal, state, regional, and local laws, rules, regulations, plans, and policies define the framework that regulates and will potentially regulate climate change. The following discussion focuses on climate change requirements applicable to the project.

Federal Plans, Policies, Regulations, and Laws

Supreme Court Ruling on California Clean Air Act Waiver

The EPA is the Federal agency responsible for implementing the Federal Clean Air Act (CAA). The U.S. Supreme Court 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. However, there are no Federal regulations or policies regarding GHG emissions applicable to the Proposed Project or other alternatives under consideration. See Assembly Bill (AB) 1493 for further information on the California Clean Air Act (CCAA) Waiver.

Energy and Independence Security Act of 2007 and Corporate Average Fuel Economy Standards

The Energy and Independence Security Act of 2007 (EISA) amended the Energy Policy and Conservation Act (EPCA) to further reduce fuel consumption and expand production of renewable fuels. The EISA's most important amendment includes a statutory mandate for the National Highway Traffic Safety Administration (NHTSA) to set passenger car corporate average fuel economy (CAFE) standards for each model year (MY) at the maximum feasible level. This statutory mandate also eliminates the old default CAFE standard of 27.5 miles per gallon (mpg). The EISA requires that CAFE standards for MY 2011-2020 be set sufficiently high to achieve the goal of an industry-wide passenger car and light-duty truck average CAFE standard of 35 mpg. The rule making for this goal, per President Obama's request, has been divided into two separate parts. The first part, which was published in the Federal Register in March 2009, includes CAFE standards for MY 2011 in order to meet the statutory deadline (i.e., March 30, 2009). The second part of the rulemaking applies to MY 2012 and subsequent years. These would be the maximum CAFE standards feasible under the limits of the EPCA and EISA. The NHTSA and the EPA are currently working in coordination to develop a national program targeting MY 2012–2016 passenger cars and light trucks.

EPA Proposed Regulations

In response to the mounting issue of climate change, EPA has taken the following actions to regulate, monitor, and potentially reduce GHG emissions.

Proposed Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons (MT) or more of CO_2 per year. This publically available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial GHG emitters, along with vehicle and engine manufacturers, will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

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

On September 15, 2009, EPA and the U.S. Department of Transportation's NHTSA proposed a new national program that would reduce GHG emissions and improve fuel economy for all new cars and trucks sold in the United States. EPA proposed the first-ever national GHG emissions standards under the CAA, and NHTSA proposed Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act. This proposed national program would allow automobile manufacturers to build a single light-duty national fleet that satisfies all requirements under both Federal programs and the standards of California and other states.

Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Federal Clean Air Act

On December 7, 2009, EPA adopted its *Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases* under the CAA (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the EPA Administrator should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., CO_2, CH_4, N_2O, HFCs, perfluorocarbons, and SF_6) in the atmosphere threaten the health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and thus to the threat of climate change.

The EPA Administrator found that atmospheric concentrations of GHGs endanger public health and welfare within the meaning of Section 202(a) of the CAA. The EPA Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare.

Council on Environmental Quality Draft National Environmental Policy Act Guidelines

Because of uneven treatment of climate change under NEPA, the International Center for Technology Assessment (ICTA), Natural Resources Defense Council (NRDC), and Sierra Club filed a petition with the Council on Environmental Quality (CEQ) in March 2008, requesting inclusion of climate change analyses in all Federal environmental review documents. In response to the petition, as well as Executive Order 13514, the CEQ issued new draft guidance on when and how to include GHG emissions and climate change impacts in environmental review documents under NEPA. The CEQ's guidance (issued on February 18, 2010) suggests that Federal agencies should consider opportunities to reduce GHG emissions caused by proposed Federal actions and adapt their actions to climate change impacts throughout the NEPA process and to address these issues in their agency NEPA procedures.

In the context of addressing climate change in environmental documentation, the two main considerations are:

1. The GHG emissions effects of a proposed action and alternative actions, and
2. The impacts of climate change on a proposed action or alternatives. The CEQ notes that "significant" national policy decisions with "substantial" GHG impacts require analysis of their GHG effects, i.e., if a proposed action causes "substantial" annual direct emissions, or if a Federal agency action implicates energy conservation, reduced energy use or GHG emissions, and/or promotes renewable energy technologies that are cleaner and more efficient.

In these circumstances, information on GHG emissions (qualitative or quantitative) that is useful and relevant to the decision should be used when deciding among alternatives. The CEQ suggests that if a proposed action causes direct annual emissions of $\geq$ 25,000 MT CO_2e, a quantitative and qualitative assessment may be meaningful to decision makers and the public. If annual direct emissions are less than 25,000 MT CO_2e, the CEQ encourages Federal agencies to consider whether the action's long-term emissions should receive similar analyses.

State Plans, Policies, Regulations, and Laws

Because every nation emits GHGs and thus makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can help to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions. Several statewide initiatives relevant to land use planning are discussed below; however, this does not represent a complete list of climate change-related legislation in California.

Assembly Bill 1493

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

To meet the requirements of AB 1493, in 2004 ARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1) require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), beginning with the 2009 model year. For passenger cars and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 pounds or less, the GHG emission limits for the 2016 model year are approximately 37% lower than the limits for the first year of the regulations, the 2009 model year. For light-duty trucks with LVW of 3,751 pounds to gross vehicle weight (GVW) of 8,500 pounds, as well as medium-duty passenger vehicles, GHG emissions would be reduced approximately 24% between 2009 and 2016.

In December 2004, a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of 13 CCR Sections 1900 and 1961 as amended by AB 1493 and 13 CCR 1961.1 (*Central Valley Chrysler-Jeep et al. v. Catherine E. Witherspoon, in Her Official Capacity as Executive Director of the California Air Resources Board, et al.*). The automobile-makers' suit in the U.S. District Court for the Eastern District of California, contended California's implementation of regulations that, in effect, regulate vehicle fuel economy, violates various Federal laws, regulations, and policies.

On December 12, 2007, the court found that if California receives appropriate authorization from EPA (the last remaining factor in enforcing the standard), then these regulations would be consistent with and have the force of Federal law, thus, rejecting the automobile-makers' claim. This authorization to implement more stringent standards in California was requested in the form of a CAA Section 209(b), waiver in 2005. Since that time, EPA failed to act on granting California authorization to implement the standards. Governor Schwarzenegger and Attorney General Edmund G. Brown filed suit against EPA for the delay. In December 2007, EPA Administrator Stephen Johnson denied California's request for the waiver to implement AB 1493. Johnson cited the need for a national approach to reducing GHG emissions, the lack of a "need to meet compelling and extraordinary conditions," and the emissions reductions that would be achieved through the Energy Independence and Security Act of 2007 as the reasoning for the denial (Office of the White House 2009).

The State of California filed suit against EPA for its decision to deny the CAA waiver. Under the Obama administration, EPA was directed to reexamine its position for denial of California's CAA waiver and for its past opposition to GHG emissions regulation. California received the waiver on June 30, 2009.

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor 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 level. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multiagency effort to reduce GHG emissions to the target levels. The Secretary must also submit biannual reports to the Governor and State Legislature describing: progress made toward reaching the emission targets; impacts of global warming on California's resources; and mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created the California Climate Action Team (CCAT) made up of members from various state agencies and commission. CCAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

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

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. 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. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Senate Bill 1368

Senate Bill (SB) 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (CPUC) to establish a GHG performance standard for baseload generation from investor-owned utilities by February 1, 2007. The CEC must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.

Executive Order S-1-07

Executive Order S-1-07, which was signed by Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at over 40% of statewide emissions. It establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10% by 2020. This order also directed ARB to determine if this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early action measure after meeting the mandates in AB 32. ARB adopted the LCFS on April 23, 2009.

Senate Bill 97

SB 97, signed August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the California Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Natural Resources Agency (CNRA) guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA by July 1, 2009. The CNRA adopted those guidelines on December 30, 2009, and the guidelines became effective March 18, 2010.

Senate Bill 375

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

This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City or County land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA would incentivize qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

Assembly Bill 32, Climate Change Scoping Plan

On December 11, 2008 ARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which functions as a roadmap of ARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations (ARB 2008). The Scoping Plan contains the main strategies California will implement to reduce CO_2e emissions to 1990 levels by 2020. The Scoping Plan also breaks down the amount of GHG emissions reductions ARB recommends for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 million metric tons (MMT) CO_2e),
- the LCFS (15.0 MMT CO_2e),
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e), and
- a renewable portfolio standard for electricity production (21.3 MMT CO_2e).

ARB has not yet determined what amount of GHG emissions reductions it recommends from local government land use decisions; however, the Scoping Plan does state that successful implementation of the plan relies on local governments' land use planning and urban growth decisions because local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions. ARB further acknowledges that decisions on how land is used will have large effects on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The Scoping Plan states that the ultimate assignment to local government operations is to be determined (ARB 2008).

The Scoping Plan expects a reduction of approximately 5.0 MMT CO_2e from local land use changes associated with implementation of SB 375, discussed above. The Scoping Plan does not include any direct discussion about GHG emissions generated by construction activity.

Addressing Climate Change at the Project Level: California Attorney General's Office

In January, 2010, the California Attorney General's Office released a document to assist local agencies with addressing climate change and sustainability at the project level under CEQA. The document provides examples of various measures that may reduce the impacts related to climate change at the individual project level. As appropriate, the measures can be included as design features of a project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees).

Regional and Local Plans, Policies, Regulations, and Ordinances

Sacramento County

Sacramento County's Board of Supervisors has approved the first phase of a climate action plan that will provide a framework for reducing GHG emissions. The first phase focuses on the County's overall strategy and goals for addressing climate change (Sacramento County 2009). Key goals in the first phase include a reduction in vehicle miles traveled (VMT) per capita in the region; improving energy efficiency of all existing and new buildings; emphasizing water use efficiency as a way to reduce energy consumption; maximizing waste diversion, composting, and recycling through residential and commercial programs; and protecting important farmlands and open space from conversion and encroachment and maintaining connectivity of protected areas.

City of Rancho Cordova

The City of Rancho Cordova has not developed a climate action plan or similar GHG emissions reduction plan for GHG emission-generating activity in its jurisdiction. The City of Rancho Cordova's General Plan does not contain any goals or policies that relate directly to climate change or GHGs, as it was prepared and adopted prior to AB 32 (City of Rancho Cordova 2006). However, as described in Appendix K, there are many policies in the City General Plan that will result in the reduction of GHG emissions even though they were not specifically adopted for that purpose (e.g., policies that reduce emissions of criteria air pollutants and vehicle trips and promote smart growth).

ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

Thresholds of Significance

Neither the ARB nor the Sacramento Metropolitan Air Quality Management District (SMAQMD) has identified a significance threshold for analyzing GHG emissions associated with a land use development projects. SMAQMD has updated its CEQA guidance, and it released its *Guide to Air Quality Assessment in Sacramento County* in December 2009 (SMAQMD 2009a). However, SMAQMD does not include any numeric GHG significance thresholds in their guide. Instead, SMAQMD suggests that lead agencies identify thresholds of significance applicable to a proposed project that are supported by substantial evidence (SMAQMD 2009a:6-5). Nevertheless, the primary focus of SMAQMD's guidance for addressing GHG emissions is "to provide guidance about evaluating whether the GHG emissions associated with a proposed project would be a cumulatively considerable contribution to global climate change" (SMAQMD 2009a:6-3).

By adoption of AB 32 and SB 97, the State of California has identified GHG emission reduction goals and that the effect of GHG emissions as they relate to global climate change is an adverse environmental impact. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change.

To meet AB 32 goals, California would need to reduce GHG emissions from current levels. It is recognized, however, that for most projects there is no simple metric available to determine if a single project would substantially increase or decrease overall GHG emission levels.

Although the text of AB 32 applies to stationary sources of GHG emissions, this mandate demonstrates California's commitment to reducing the rate of GHG emissions and the state's associated contribution to climate change, without intent to limit population or economic growth within the state. Thus, to achieve the goals of AB 32, which are tied to GHG emission rates of a specific benchmark year (i.e., 1990), California would have to achieve a lower rate of emissions. Further, to accommodate *future* population and economic growth, the state would have to achieve an even lower rate of emissions than was achieved in 1990. (The goal to achieve 1990 quantities of GHG emissions by 2020 means that this will need to be accomplished in the face of 30 years of population and economic growth beyond 1990.) Thus, future planning efforts that would not encourage reductions in GHG emissions or not enable land uses to operate in a GHG-efficient manner would conflict with the policy decisions contained in the spirit of AB 32, thus impeding California's ability to comply with the mandate.

If a statewide context for addressing GHG emissions is applied, any net increase in GHG emissions within state boundaries would be considered "new" emissions. A land development plan, such as the SunCreek Specific Plan, does not create "new" emitters of GHGs, but would theoretically accommodate a greater number of residents and employees in the state. Some of the residents and employees that move to, or work within the project could already be residents and employees in California, while others may be from out-of-state (or would "take the place" of in-state residents who "vacate" their current residences to move to the new project site). The out-of-state residents would be contributing new emissions in a statewide context, but would not necessarily be generating new emissions in a global context. Given the statewide context established by AB 32, the project would need to accommodate an increase in population and employment in a manner that would not inhibit the state's ability to achieve the goals of lower emissions overall.

The State of California has established GHG emission reduction targets and has determined that GHG emissions as they relate to global climate change are a source of adverse environmental impacts in California that should be addressed under CEQA. AB 32 identifies the myriad of environmental problems in California caused by global warming (California Health and Safety Code, Section 38501[a]). Senate Bill 97directed OPR to prepare revisions to the State CEQA Guidelines addressing the mitigation of GHGs or their consequences.

As an interim step toward development of required guidelines, in June 2008, OPR published a technical advisory, entitled *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review* (OPR 2008). In this technical advisory, OPR recommends that the lead agencies under CEQA make a good-faith effort, based on available information, to estimate the quantity of GHG emissions that would be generated by a proposed project, including the emissions associated with vehicular traffic, energy consumption, water usage, and construction activities, to determine whether the impacts have the potential to result in a project or cumulative impact and to mitigate the impacts where feasible mitigation is available.

OPR's technical advisory also acknowledges that "perhaps the most difficult part of the climate change analysis will be the determination of significance," and noted that "OPR has asked ARB technical staff to recommend a method for setting thresholds which will encourage consistency and uniformity in the CEQA analysis of GHG emissions throughout the state." ARB has not yet completed this task at the time of writing this EIR/EIS.

The thresholds for determining the significance of impacts for this analysis are based on the *CEQA Guidelines* amendments (environmental checklist in Appendix G of the State CEQA Guidelines, as amended). These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. An impact related to global climate change (i.e., the projected GHG emissions generated by the project) is considered significant if the Proposed Project or other alternatives under consideration would do any of the following:

- generate greenhouse gas 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 greenhouse gases.

SMAQMD also recommends that the GHG analysis of an EIR address the above two criteria (SMAQMD 2009a:6-6).

At the time of this writing, neither ARB nor SMAQMD have adopted quantitative thresholds of significance for GHG emissions. Therefore, to establish additional context in which to consider the order of magnitude of the project's construction-related and operational GHG emissions, this analysis takes into account the following considerations about what levels of GHG emissions constitute a cumulatively considerable incremental contribution to climate change:

- Facilities (i.e., stationary, continuous sources of GHG emissions) that generate greater than 25,000 MT CO_2e per year are mandated to report their GHG emissions to ARB pursuant to AB 32.
- Stationary sources that generate greater than 10,000 MT CO_2 per year may be required to participate in the cap-and-trade program through the Western Climate Initiative (ARB 2009d).

It is not the City's intent to adopt the above-listed emission levels as a numeric threshold. Rather, the intent is to put project-generated GHG emissions into the appropriate statewide context in order to evaluate whether the GHG emissions contribution resulting from construction and operation of the SunCreek project would result in a cumulatively considerable incremental contribution to the cumulative impact of global climate change.

SMAQMD's CEQA guidance states that the finite amount of a project's construction-related GHG emissions and the operational GHG emissions generated per year over the lifetime of the project should be disclosed separately, and that lead agencies may decide to amortize the level of short-term construction emissions over the expected (long-term) operational life of a project. Operational life of a building can be estimated to be 40 years for new residential and 25 years for conventional commercial (SMAQMD 2009:6-8). SMAQMD recommends Best Management Practices (BMPs) for mitigation of construction-generated GHGs, which are discussed in "Impact Analysis."

SMAQMD does not have adopted thresholds or specific guidance regarding setting of thresholds, other than the following: (1) the adopted threshold should convey information about a project's GHG emissions to the public and lead agency in an appropriate, meaningful, and consistent context, and (2) the metric should provide a useful means by which to compare one project to another and also evaluate whether a project is consistent with statewide goals (SMAQMD 2009:6-9).

For program-level analyses (for general and specific plans), SMAQMD's CEQA guidance recommends that thresholds of significance for GHG emissions be related to AB 32's GHG reduction goals. For example, a numeric GHG reduction target representative of 1990 levels despite planned population and employment growth (e.g., 30 percent below current levels) may be adopted as a policy within the lead agency's general or area plan (SMAQMD 2009:9-9).

SMAQMD also states that another possible threshold option could include the determination of whether the population and employment growth and resultant GHG emissions of the proposed plan are consistent with the state's strategy to achieve the 2020 GHG emissions limit, as outlined in the Scoping Plan. A lead agency could set a threshold using an efficiency-based GHG metric such as per-capita emissions, per-job emissions, or a "service population" metric that combines per-capita and per-job emissions, or other similar metrics. (SMAQMD 2009:9-9).

A lead agency may rely on a Climate Action Plan for CEQA analysis of greenhouse gases for projects if certain criteria are met (please refer to CEQA Guidelines Section 15183.5 for more information).

For the purposes of this EIR/EIS, the net change in GHG emissions associated with the project are quantified and used as a criterion to determine whether the associated emissions would substantially help or hinder the state's ability to attain the goals identified in AB 32 (i.e., reduction of statewide GHG emissions to 1990 levels by 2020).

The analysis of GHG emissions in this EIR/EIS recognizes that the impact that GHG emissions have on global climate change does not depend on whether they are generated by stationary, mobile, or area sources, or whether they are generated in one region or another. As stated above, the mandate of AB 32 demonstrates California's commitment to reducing GHG emissions and the state's associated contribution to climate change, without intending to limit population or economic growth within the state. Thus, to achieve the goals of AB 32, which are tied to mass GHG emission levels of a specific benchmark year (i.e., 1990), California would have to achieve a lower rate of emissions per unit of population (per person) and/or per level of economic activity (e.g., per job) than its current rate. Furthermore, to accommodate future population and economic growth, the state would have to achieve an even lower rate of emissions per unit than it achieved in 1990. The goal—to achieve 1990 quantities of GHG emissions by 2020—will need to be accomplished despite 30 years of population and economic growth beyond 1990. For this reason, land uses need to be GHG "efficient" to attain AB 32 goals while accommodating population and job growth.

The City has elected to use a threshold of significance for GHG emissions that is related to the statewide GHG emissions reduction needed to achieve the AB 32 emissions mandate in 2020. When the 2008 Scoping Plan was published, ARB staff used the best available information at that time to estimate California's 2020 GHG emissions inventory. The 2020 emissions baseline used in the 2008 Scoping Plan was 596 MMT CO_2e.[1] The AB 32 emissions limit is 427 MMT CO_2e. The difference between the 2020 statewide inventory estimate and the AB 32 limit is approximately 28.4%. Based on this, the City has developed the following numeric threshold:

- The project would have a cumulatively considerable contribution to climate change impacts if it would result in a net increase of construction and operational greenhouse gas emissions, either directly or indirectly, and if statewide GHG reduction measures and project mitigation together would achieve less than a 28.4% total reduction compared to unmitigated emissions.

This threshold was chosen in spite of the fact that the Scoping Plan attributed only 8% of the 2020 Business As Usual emissions inventory to the commercial and residential sector, and allocated only relatively minimal emission reductions to the land use sector (ARB 2008). The only measure particularly aimed at the land use sector – regional transportation-related GHG targets – sets a 5 MMT CO_2e goal, which represents less than 3% of the 169 MMT CO_2e necessary reductions under AB 32 that were estimated by ARB in 2008 (ARB 2008). As part of ARB's July 2011 revision to projected Business As Usual 2020 emissions, ARB noted that this 5.0 MMT CO_2e reduction was a placeholder in the 2008 Scoping Plan for what could be achieved through regional transportation-related GHG targets, and that a 3.0 MMT CO_2e reduction is the aggregate from the regional passenger vehicle GHG reduction targets established for the 18 Metropolitan Planning Organizations approved in 2010 (ARB 2011, page 3). By using a significance threshold of 28.4%, the project is assuming a disproportionately high percentage of GHG reductions in relation to the targets assigned by ARB to the land use sector. Therefore, the City believes that the use of this threshold for determining whether the project will result in a cumulatively considerable contribution to the significant cumulative impact of global climate change is conservative. A project that does not meet this percentage reduction may well not have a significant impact under CEQA. However, in light of the absence of an adopted significance threshold applicable to projects located in the City and the legal and scientific uncertainty regarding the impact of GHG emissions from land use projects, the City is using this significance threshold for this project at this time. The use of the significance threshold in this EIR does not establish a Citywide significance threshold for analysis of GHGs for all land use or other types of projects.

The City has elected to compare the project, as if it were built out according to 2005 regulations (when AB 32 was being developed) to the project, as if built out according to regulations as they would apply in 2020 and taking into account project mitigation and design features that reduce GHG emissions. If the difference between these two totals is less than 28.4 percent, the project would have a cumulatively considerable contribution to the significant cumulative impact of global climate change. This numeric threshold would allow the City to determine

[1] ARB has since revised the original 2020 "business as usual" statewide GHG emissions estimate. The revisions take into account the economic recession and the availability of updated information from development of measure-specific regulations. The 2020 estimate may continue to change to reflect economic conditions and the continued rollout of AB 32 related regulations. For more information, please refer to ARB's Website: http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf.

whether the project at hand as achieved its "fair share" of emissions reductions needed to reach the AB 32 mandate statewide. Although under AB 32, different levels of emissions reduction will be achieved from different emissions sectors, the City's threshold allows an overall comparison of a project's emissions reductions with the statewide percentage emissions reductions from all sectors that would have been required according to the 2008 Scoping Plan to achieve the AB 32 emissions mandate.

This approach focuses on a 2020 timeline, consistent with the legislative mandate embodied in AB 32. Although construction and operation of the SPA will continue beyond 2020, calculation of a post-2020 GHG performance metric is too speculative at the present time. One of the primary challenges to establishing a reasonable threshold and determining impacts (and mitigation) relates to enactment of AB 32 and other GHG emission-reduction legislation. As previously described, much of this legislation requires ARB and other agencies to establish policies and regulations that relate to energy efficiency, carbon levels in fuels, stationary source emissions, and regional transportation planning (i.e., SB 375). Many of these individual regulations are in the development process and may be a few to several years away from implementation. The project, however, would also be in development for two decades, and during its lifetime would be subject to these as-yet-undeveloped policies and regulations. There is not a comprehensive regulatory or legislative framework for addressing GHG emissions beyond 2020. Consequently, local governmental agencies are caught in a transitional period during which they must decide on some GHG emission reduction target for land uses below business as usual, but it is unknown whether they will hit the target or need to impose additional GHG reduction measures in the future. This challenge is discussed in more detail in the "Impact Analysis" section below. Currently, GHG emissions are being reduced by policies, rules, and programs outlined in the Scoping Plan to meet the goal of 1990 GHG emission levels by 2020; there are no such policies, rules, and programs in place to address post-2020 GHG emissions. As the regulatory environment develops, and a post-2020 performance standard (or other GHG threshold of significance) is developed at the Federal, state, and/or local air district level, individual increments of development would be required to comply with this and all other future applicable CEQA requirements.

Although, for the purposes of a significance determination, a 2020 timeline is used, the City also reports GHG emissions estimates for the anticipated buildout year (2032).

Analysis Methodology

The methodology used in this EIR/EIS to analyze the project's contribution to global climate change includes a calculation of GHG emissions and a discussion about the context in which they can be evaluated and mitigated. The project's GHG emissions have been calculated for informational and comparative purposes, as SMAQMD has not adopted a quantifiable threshold for evaluating significance of project-level GHG emissions on the impact of global climate change.

At the time of writing this EIR/EIS, neither ARB nor SMAQMD has formally adopted a recommended methodology for estimating GHG emissions associated with development projects. The Bay Area Air Quality Management District (BAAQMD) has recommended use of the BAAQMD Greenhouse Gas Model (BGM) (Rimpo and Associates 2010), which was developed for use with URBEMIS (Rimpo and Associates 2008). BGM estimates operational GHG emissions associated with development of a project (apart from and including those already calculated in URBEMIS), including transportation, electricity, natural gas, solid waste, water and wastewater, and area-source (hearth and landscaping) emissions. With additional user input, BGM will provide estimates of GHG emissions from agriculture, off-road equipment, and refrigerants. URBEMIS and BGM also calculate GHG reductions associated with various mitigation measures.

Though SMAQMD has not developed a numeric threshold of significance for determining cumulative significance, its *Guide to Air Quality Assessment in Sacramento County* (2009) does recommend that lead agencies estimate GHG emissions associated with short-term, project-related construction activities, as well as the long-term, operational emissions associated with a project, including direct mobile- and area-source GHG emissions and indirect emissions associated with the project's consumption of electricity and water (SMAQMD 2009a:6-6).

GHG emissions associated with construction and operation of the Proposed Project and the other four action alternatives were modeled using URBEMIS 2007 version 9.2.4 (Rimpo and Associates 2008) and BGM version 1.1.9 beta (Rimpo and Associates 2010). Land use and trip generation data for the Proposed Project and the other four action alternatives were obtained from the project applicants and traffic consultant (Fehr & Peers 2010).

Total construction emissions for the 20-year buildout period (2012 to 2032) associated with implementation of the Proposed Project and the other four action alternatives were estimated using the URBEMIS 2007 Version 9.2.4 computer program (Rimpo and Associates 2008). URBEMIS is designed to model construction emissions for land use development projects based on building size, land use and type, and disturbed acreage and allows for the input of project-specific information.

Construction-generated GHG emissions were modeled based on general information provided in Chapter 2, "Alternatives," and default SMAQMD-recommended settings and parameters attributable to the proposed land use types and site location. Modeling was conducted using the same assumptions for estimating construction-generated emissions of criteria air pollutants and precursors, which are listed in the discussion under Impact 3.2-1 of Section 3.2, "Air Quality."

Development of the SPA would occur over a large area (approximately 1,250 acres, about 1,017 acres of which would be graded), and for modeling purposes, is assumed to occur in three phases over the course of 20 years (6.67 years per phase) (see Exhibit 2-22 in Chapter 2, "Alternatives"). Large portions of the SPA, the largest being 570 acres or 56% of the total graded area, could undergo construction during a single phase, which would require substantial amounts of earthwork and grading.

For purposes of this analysis, construction of the site was assumed to commence in 2012 and last until approximately 2032. Given that exhaust emission rates of the construction equipment fleet in the state are expected to decrease over time due to state and SMAQMD-led efforts, maximum daily construction emissions were estimated using the earliest possible calendar date when construction would begin (i.e., 2012) in order to generate conservative estimates. In the event that construction begins later, the emissions estimates would be lower than presented here. It is anticipated that in later years, advancements in engine technology, retrofits, and turnover in the equipment fleet would result in increased fuel efficiency, potentially more alternatively-fueled equipment, and lower levels of GHG emissions. While the URBEMIS model can account for potential mitigations, this analysis calculated likely reductions using tools other than URBEMIS. As described in more detail later, for the purposes of estimating the effect of project design features and mitigation, CAPCOA's 2010 document, *Quantifying Greenhouse Gas Mitigation Measures*, was used. Also, the URBEMIS model does not account for reductions in CO_2 emission rates that would affect future construction activity due to the regulatory environment that is expected to evolve under AB 32. For instance, ARB's Scoping Plan identifies the need to expand efficiency strategies and low carbon fuels for heavy-duty and off-road vehicles (ARB 2008).

BGM was developed using vehicle fleet characteristics, energy consumption, waste generation, water use, and wastewater generation data specific to the San Francisco Bay Area. For the purposes of estimating GHG emissions from the Proposed Project and the other four action alternatives, Sacramento area parameters were used to overwrite the BGM defaults. EMFAC 2007 (ARB 2006) and the Pavley I + LCFS Postprocessor Ver1.0 (ARB 2010b) were also run for the Proposed Project and the other four action alternatives to adjust BGM mobile source emissions and reductions associated with the Pavley (AB 1493) and the LCFS (AB 32/Scoping Plan) regulations. All modeling assumptions and output are contained in Appendix N.

The effectiveness of project design features and mitigation was estimated along with the effect of relevant statewide GHG reduction measures. The effect of statewide measures was calculated independent of the effectiveness of project design features and mitigation, for disclosure purposes. The total effectiveness of adopted statewide measures and project design features and mitigation was summarized against a target of a 28.4% reduction compared to the "No Action Taken" scenario. The No Action Taken scenario represents the project built out and cumulative construction emissions for the life of the project, assuming 2005 regulatory requirements. One particular focus of analysis was of measures included in the SunCreek Air Quality Mitigation Plan (AQMP). Quantification of the benefits of the AQMP measures mostly relies on CAPCOA's 2010 document, *Quantifying Greenhouse Gas Mitigation Measures*.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.4-1	**Generation of Short-Term, Construction-Related and Long-Term Operational GHG Emissions.** *Project-related construction activities associated with development of the project would result in increased generation of temporary and short-term construction-related GHG emissions. Operation of the project over the long term would result in increased generation of GHGs, which would contribute considerably to cumulative GHG emissions.*

NP

Because the project would not be implemented, **no direct** or **indirect** project-related impacts would occur related to construction-generated GHG emissions. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

NCP, PP

Similar types of emission-generating activities would occur during construction of all five action alternatives. Construction-generated GHG emissions associated with each alternative would differ in the total number of residential units, commercial square footage, office square footage, and school square footage to be developed.

GHG emissions would be generated throughout the operational life of action alternatives, also. Operational emissions may be both direct and indirect emissions, and would be generated by area, mobile, and stationary sources. Direct area-source emissions would be associated with activities, such as combustion of natural gas for hearth furnaces and maintenance of landscaping and grounds. Natural gas combustion for space and water heating is also a direct area source of GHG emissions, but is considered separately from other area-sources. Direct mobile-source emissions of GHGs would include project-generated vehicle trips for residents, employees, and visitors. Lastly, solid waste and wastewater generated by activities within the SPA would result in direct, off-site emissions of GHGs.

A summary of the GHG emissions generated during buildout of all action alternatives is presented in Table 3.4-1. Refer to Appendix N for a detailed summary of the modeling assumptions, inputs, and outputs. Construction-related emissions are described in detail first, followed by operational emissions.

Construction

Heavy-duty off-road equipment, materials transport, and worker commutes during construction of the No USACE Permit and Proposed Project Alternatives would result in exhaust emissions of GHGs. Because specific data about the individual construction projects within each phase (e.g., construction equipment types and number requirements) were not available at the time of this analysis, URBEMIS defaults were used (see Appendix N for the detailed construction equipment list and schedule).

GHG emissions generated by construction would be primarily in the form of CO_2. Although emissions of other GHGs, such as CH_4 and N_2O, are important with respect to global climate change, the emission levels of these other GHGs from on- and off-road vehicles used during construction are relatively small compared with CO_2 emissions, even when factoring in the relatively larger global warming potential of CH_4 and N_2O.

As shown in Table 3.4-1, estimated GHG emissions from construction during the 20-year buildout horizon of the No USACE Permit Alternative would be approximately 11,610 MT CO_2. As shown in Table 3.4-1, estimated GHG emissions from construction during the 20-year buildout of the Proposed Project Alternative would be approximately 17,010 MT CO_2. These values account for exhaust emissions of GHGs that would be generated by heavy-duty equipment, haul trucks, and vehicle trips.

Additional GHG emissions would also be "embodied" in the materials selected for construction, and, depending on where the materials were manufactured, long-distance transport emissions associated with delivery of materials to the SPA may be substantial. The level of embodied GHG emissions within building materials can vary substantially according to which materials are selected. This is particularly the case for construction of buildings and infrastructure that involve high quantities of cement or steel (EPA 2009:4).[2]

ARB's Scoping Plan does not directly discuss GHG emissions generated by construction activity. However, it does recommend measures for improving the efficiency of medium- and heavy-duty on-road vehicles (1.4 MT CO_2e) and expanded efficiency strategies for off-road vehicles (e.g., forklifts, bulldozers). For this reason, levels of GHG emissions associated with construction activity are expected to decrease over time as new regulations are developed under the mandate of AB 32.

Operational

Indirect emissions sources include stationary-source emissions from electricity generation at off-site utility providers that would supply power to the SPA. The GHGs associated with the consumption of electricity in the SPA are indirect emissions. Consumption of water within the SPA would also result in indirect GHG emissions because of the electricity consumption associated with the off-site conveyance, distribution, and treatment of that water.

GHG emissions generated by operation of the proposed land uses would be primarily in the form of CO_2, except those generated by the decomposing organic fraction of solid waste, as well as wastewater treatment, which are primarily CH_4.

Emissions of GHGs are influenced by the location of various land uses (i.e., the layout of the Specific Plan influences trip lengths and travel modes) and the design of the land uses (the degree to which the land uses are designed to accommodate non-automobile travel, maximize energy efficiency, including building energy efficiency, water use (including landscaping), waste and wastewater generation, etc.). Similarly, the layout and design of projects constructed within the SPA will influence the relative level of GHG emissions.

At the time of writing this EIR/EIS, emission factors and calculation methods for GHGs from development projects have not been formally adopted for use by the state or SMAQMD. Direct and indirect operational CO_2e

[2] Such materials would be present and would be intended to meet general market demand, regardless of whether the project moves forward. To clarify whether life cycle emissions should be a part of the CEQA analyses, 2010 amendments to the State CEQA Guidelines removed the term "life cycle," since "the term could refer to emissions beyond those that could be considered indirect effects of a project as that term is defined in Section 15358 of the State CEQA Guidelines." Life cycle emissions, therefore, are not included in the totals presented here for any of the action alternatives. For more information, please refer to CNRA 2009.

emissions were estimated using URBEMIS 2007 version 9.2.4 (Rimpo and Associates 2008) and BGM version 1.1.9 beta (Rimpo and Associates 2010), as described previously.

A summary of the operational GHG emissions were estimated for full buildout of the Proposed Project and the other four action alternatives in the year 2032 and are presented in Table 3.4-1. The annual operational emissions levels under each alternative were estimated using the best available methodologies and emission factors. However, for some operational GHG emission sources, GHG emission rates and activity levels for future years are not yet developed, in part, because regulations continue to evolve under the mandate of AB 32. The URBEMIS and BGM models do not yet account for the impact reductions of the future regulatory environment and future technological improvements that will result in GHG efficiencies. Thus, this analysis uses the emissions estimates modeled for full buildout as a conservative proxy for evaluating GHG emissions associated with operation of the Proposed Project and action alternatives.

As shown in Table 3.4-1, estimated annual GHG emissions associated with operation of the land uses proposed under the No USACE Permit Alternative would total approximately 72,573, MT CO_2e/year. As shown in Table 3.4-1, estimated annual GHG emissions associated with operation of the land uses proposed under the Proposed Project would total approximately 109,627 MT CO_2e/year.

The annual CO_2e values in Table 3.4-1 for each alternative are higher than what would likely occur. Mobile-source emissions, which are estimated to be 56-62% of the total operational emissions (depending on which action alternative is selected), take into account the Pavley and LCFS GHG reductions (see "Analysis Methodology" section above), but are also based on the VMT and trip rates generated by the traffic study, which are somewhat conservative. The estimate of indirect GHG emissions related to electricity consumption, the second largest category of operational GHG emissions shown in Table 3.4-1, does not account for reductions that will result from future regulatory changes under AB 32, such as the alternative-energy mandate of SB 107, which would be implemented before full buildout of the Proposed Project and action alternatives. Additionally, SB 1368 will require more stringent emissions performance standards for new power plants – both in-state and out-of-state – that will supply electricity to California consumers. Lastly, rates of energy consumption will be reduced with implementation of the 2010 California Green Building Standards Code (CalGreen), which was drafted, in part, to improve energy efficiency and conserve water.

Further reductions are also expected from other regulatory measures that will be developed under the mandate of AB 32, as identified and recommended in ARB's Scoping Plan (ARB 2008). In general, the Scoping Plan focuses on achieving the state's GHG reduction goals with regulations that improve the efficiency of motor vehicles and the production (and consumption) of electricity. Even without project-specific mitigation, the rate of GHG emissions from the proposed development are projected to decrease in subsequent years as the regulatory environment progresses under AB 32. Additionally, new technology improvements may become available or the feasibility of existing technologies may improve.

Based on the GHG emissions estimates, without the application of statewide reduction measures and project design features or mitigation to reduce total emissions by at least 28.4%, implementation of any of the action alternatives would result in a cumulatively considerable contribution to a **significant** cumulative impact related to long-term operational generation of GHGs. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.2-1a.

Mitigation Measure 3.4-1a: Implement Measures to Reduce Construction-Generated GHG Emissions.

Prior to releasing each request for bid to contractors for the construction of each development phase, project applicants shall obtain the most current list of construction-related GHG reduction measures that are published by SMAQMD. All feasible measures from this list shall be implemented in the project's construction contract with the selected primary contractor. Project applicants may submit to City and SMAQMD a report that substantiates why specific measures are considered infeasible for construction of

Table 3.4-1
Summary of Modeled Greenhouse Gas Emissions (CO_2e) from Project Construction and Operations for the Action Alternatives Under Consideration

Source	CO_2e Emissions by Alternative[1]				
	NCP	PP	BIM	CS	ID
Cumulative Construction Emissions over Buildout Period (2012–2032) (metric tons) [2]	11,610	17,010	13,035	13,867	18,597
Approximate Annual Amortized Construction Emissions (assuming 40-year project life) (MT CO_2e/yr)	290	425	326	347	465
Operational Emissions at Full Buildout (Year 2032) (metric tons/year)					
Transportation[3]	40,890	67,270	41,945	53,398	64,290
Area Source[3]	29	33	32	33	60
Electricity[4]	17,167	23,883	15,450	17,952	21,690
Natural Gas[5]	9,741	10,102	8,931	9,770	11,738
Water and Wastewater[6]	1,075	1,461	1,323	1,403	1,674
Solid Waste	3,671	6,878	3,273	3,910	4,697
Total Operational Emissions[7]	**72,573**	**109,627**	**70,953**	**86,465**	**104,149**
Percentage GHG Reduction from Statewide Measures	**23.3%**	**23.5%**	**23.1%**	**23.2%**	**23.2%**
Percentage GHG Reduction from Project Design Features	**5.2%**	**5.6%**	**5.2%**	**5.1%**	**5.1%**
Total Percentage GHG Reduction from Statewide Measures + Project Design Features[8]	**28.4%**	**29.1%**	**28.3%**	**28.3%**	**28.3%**
Total Annual Operational Emissions + Construction Emissions (construction amortized over 40 years)[7]	**72,863**	**110,052**	**71,279**	**86,812**	**104,614**

Notes: CO_2e = carbon dioxide equivalent; NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development); GHG = greenhouse gas; SP = Service Population; AB = Assembly Bill; ARB = Air Resources Board; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; VMT = vehicle miles traveled; CCAR = California Climate Action Registry; CEC = California Energy Commission

1 The values presented do not include the full life cycle of GHG emissions that would occur over the production/transport of materials used during the construction of each build alternative or used during the operational life of the project, construction waste that would be generated over the life of the project, and the end of life for the materials and processes that would occur as an indirect result of the project. Estimating the lifecycle GHG emissions associated with these processes would be too speculative for meaningful consideration and would require analysis beyond the current state of the art in impact assessment, and may lead to a false or misleading level of precision in reporting operational GHG emissions. Note that this table does not include the No Project Alternative, because information regarding development under this alternative was not available at the time of writing this EIR/EIS.

2 Construction emissions were modeled with the URBEMIS 2007 computer model using the same assumptions and input parameters to estimate criteria air pollutant emissions in Section 3.2, "Air Quality – Land." The URBEMIS 2007 model does not account for CO_2 emissions associated with the production and long-range transportation of concrete or other building materials used in project construction. It also does not estimate GHG emissions other than CO_2, though the levels of these pollutants (i.e., CH_4 and N_2O) are expected to be nominal in comparison to the estimated CO_2 levels, even considering their respective global warming potentials. Estimated values represent the levels of construction-generated GHG emissions that would be generated during the entire 20-year construction period. See Appendix N for detailed calculations.

3 Direct operational area- and mobile-source emissions were modeled using the URBEMIS 2007 and BGM computer models, based on VMT and the number of trips obtained from the traffic analysis, as well as the same assumptions and input parameters used to estimate criteria air pollutant emissions in Section 3.2, "Air Quality." EMFAC 2007 and the Pavley I + LCFS Post-Processor were used to adjust mobile source CO_2 emissions reductions applied by BGM to account for the difference in vehicle fleets between Sacramento County and the Bay Area. See Appendix N for detailed calculations.

4 Indirect operational CO_2e emissions associated with electricity consumption were estimated using BGM with commercial and residential parameters from SMUD and EIA, to adjust for Sacramento-specific conditions. See Appendix N for detailed calculations.

5 Direct operational CO_2e emissions associated with gas consumption were estimated using BGM with commercial and residential parameters from PG&E and EIA, to adjust for Sacramento-specific conditions. See Appendix N for detailed calculations.

6 Electricity consumption associated with the consumption of water was estimated using BGM and projected demand factors for Sacramento County. See Appendix N for detailed calculations.

7 Forty years is the presumed lifetime of the project for calculating cumulative GHG emissions, per SMAQMD (SMAQMD 2009:6-8).

8 Emission reductions from applicable statewide measures, project design features, and mitigation were estimated for each alternative. Details are in Appendix N.

Source: Modeling performed by AECOM in 2010 and 2012

that particular development phase and/or at that point in time. The report, including the substantiation for not implementing particular GHG reduction measures, shall be approved by the City in consultation with SMAQMD prior to the release of a request for bid by project applicants for seeking a primary contractor. By requiring that the list of feasible measures be established prior to the selection of a primary contractor, this measure requires that the ability of a contractor to effectively implement the selected GHG reduction measures be inherent to the selection process.

SMAQMD's recommended measures for reducing construction-related GHG emissions at the time of writing this EIR/EIS are listed below (SMAQMD 2010). Those that are duplicative of Mitigation Measure 3.2-1a were removed:

- Improve fuel efficiency from construction equipment:
  - Train equipment operators in proper use of equipment.
  - Use the proper size of equipment for the job.
  - Use equipment with new technologies (repowered engines, electric drive trains).
- Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).
- Use alternative fuels for generators at construction sites such as propane or solar, or use electrical power.
- Use an ARB approved low carbon fuel for construction equipment. (NOx emissions from the use of low carbon fuel must be reviewed and increases mitigated.)
- Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.
- Reduce electricity use in the construction office by using compact fluorescent bulbs, powering off computers every day, and replacing heating and cooling units with more efficient ones.
- Recycle or salvage non-hazardous construction and demolition debris (goal of at least 75% by weight).
- Use locally sourced or recycled materials for construction materials (goal of at least 20% based on costs for building materials, and based on volume for roadway, parking lot, sidewalk and curb materials). Wood products utilized should be certified through a sustainable forestry program.
- Minimize the amount of concrete for paved surfaces or utilize a low carbon concrete option.
- Produce concrete on-site if determined to be less emissive than transporting ready mix.
- Use SmartWay certified trucks for deliveries and equipment transport.
- Develop a plan to efficiently use water for adequate dust control.

Implementation: Project applicants during any particular discretionary development application.

Timing: Before approval of final maps and building permits for all project phases and implementation throughout project construction.

Enforcement: City of Rancho Cordova Community Development Department in consultation with SMAQMD.

Mitigation Measure 3.4-1b: Implement Measures to Reduce Long-Term, Operational GHG Emissions

Project applicants shall submit to the City a list of feasible energy efficient design standards to be considered in the project-specific design review. These energy conservation measures, which will be incorporated into the design, construction, and operational aspects of proposed projects, would result in a reduction in overall project energy consumption and GHGs. The project-specific design review shall further identify potentially feasible GHG reduction measures that reflect the current state of the regulatory environment and available incentives. The City shall review and ensure inclusion of the design features in the project before the applicants can receive the City's discretionary approval for projects developed within the SPA. In determining what measures should appropriately be imposed by the City under the circumstances, the City shall consider the following factors:

- the extent to which rates of GHG emissions generated by motor vehicles traveling to, from, and within the project site are projected to decrease over time as a result of regulations, policies, and/or plans that have already been adopted or may be adopted in the future by ARB or other public agency pursuant to AB 32, or by EPA;

- the extent to which mobile-source GHG emissions, which at the time of writing this EIR/EIS comprise a substantial portion of the state's GHG inventory, can also be reduced through design measures that result in trip reductions and reductions in trip length;

- the extent to which GHG emissions emitted by the mix of power generation operated by SMUD, the electrical utility that will serve the project site, are projected to decrease pursuant to the Renewables Portfolio Standard, as well as any future regulations, policies, and/or plans adopted by the federal and state governments that reduce GHG emissions from power generation;

- the extent to which any stationary sources of GHG emissions that would be operated on a proposed land use (e.g., industrial) are already subject to regulations, policies, and/or plans that reduce GHG emissions, particularly any future regulations that will be developed as part of ARB's implementation of AB 32, or other pertinent regulations on stationary sources that have the indirect effect of reducing GHG emissions;

- the extent to which other mitigation measures imposed on the project to reduce other air pollutant emissions may also reduce GHG emissions;

- the extent to which replacement of CCR Title 24 with the California Green Building Standards Code or other similar requirements will result in new buildings being more efficient and thus, more GHG-energy efficient; and

- whether total costs of proposed mitigation for GHG emissions together with other mitigation measures required for the proposed development are so great that a reasonably prudent property owner would not proceed with the project in the face of such costs.

GHG emission reduction strategies and their respective feasibility are likely to evolve over time. Project applicants shall consider and implement, as feasible, the following non-exclusive and non-exhaustive list of measures, listed below. These measures are derived from multiple sources, including the SMAQMD's Draft GHG Measures (SMAQMD 2009); *Mitigation Measure Summary* in Appendix B of the California Air Pollution Control Officer's Association (CAPCOA) white paper, *CEQA & Climate Change* (CAPCOA 2009a); CAPCOA's *Model Policies for Greenhouse Gases in General Plans* (CAPCOA 2009b); the California Attorney General's Office publication entitled *The California Environmental*

Quality Act: *Addressing Global Warming Impacts at the Local Agency Level* (California Attorney General's Office 2008); and the BAAQMD's CEQA Guidelines (BAAQMD 2010:4-14–4-19).

Projects will be required to implement, to the maximum extent feasible, mitigation measures that, combined with the application of applicable statewide reduction measures, would be sufficient to achieve at least a 28.4% reduction in GHG emissions compared to the unmitigated project as if it was constructed in compliance with the 2005 (pre-AB 32) regulatory environment.

Energy Efficiency

- Include clean alternative energy features to promote energy self-sufficiency (e.g., photovoltaic cells, solar thermal electricity systems, small wind turbines).
- Install solar water heaters.
- Buildings will be designed to exceed Title 24 building envelope energy efficiency standards by 20%.
- Require smart meters and programmable thermostats.
- Perform HVAC duct sealing and conduct periodic inspection.
- Site buildings to take advantage of shade and prevailing winds and design landscaping and sun screens to reduce energy use. Plant shade trees within 40 feet of the south sides or within 60 feet of the west sides of properties.
- Install efficient lighting in all buildings (including residential). Also install lighting control systems, where practical. Maximize daylight as an integral part of lighting systems in all buildings.
- Install cool roof materials (albedo ≥ 30).
- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes.

Water Conservation and Efficiency

- With the exception of ornamental shade trees, use water-efficient landscapes with native, drought-resistant species in all public area and commercial landscaping. Use water-efficient turf in parks and other turf-dependent spaces.
- Install the infrastructure and necessary treatment to use reclaimed water for landscape irrigation and/or washing cars, including installation of rainwater collection systems.
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
- Design buildings and lots to be water-efficient. Only install water-efficient fixtures and appliances.
- Restrict watering methods (e.g., prohibit systems that apply water to nonvegetated surfaces) and control runoff. Prohibit businesses from using pressure washers for cleaning driveways, parking lots, sidewalks, and street surfaces. These restrictions should be included in the Covenants, Conditions, and Restrictions of the community.
- Provide education about water conservation and available programs and incentives.

- To reduce stormwater runoff, which typically bogs down wastewater treatment systems and increases their energy consumption, construct driveways to single-family detached residences and parking lots and driveways of multi-family residential uses with pervious surfaces. Possible designs include Hollywood drives (two concrete strips with vegetation or aggregate in between) and/or the use of porous concrete, porous asphalt, turf blocks, or pervious pavers.

- Comply with any applicable water conservation ordinances.

Solid Waste Measures

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).

- Provide interior and exterior storage areas for recyclables, food waste and green waste at all buildings; create food waste and greenwaste curbside pickup.

- Provide adequate recycling containers in public areas, including parks, school grounds, golf courses, and pedestrian zones in areas of mixed-use development.

- Provide education and publicity about reducing waste and available recycling services.

Transportation and Motor Vehicles

- Promote ride-sharing programs and employment centers (e.g., by designating a certain percentage of parking spaces for ride-sharing vehicles, designating adequate passenger loading and unloading zones and waiting areas for ride-share vehicles, and providing a Web site or message board for coordinating ride-sharing).

- Provide the necessary facilities and infrastructure in all land use types to encourage the use of low- or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).

- Provide the necessary facilities and maintenance for free tire inflation.

- Provide transit stops with safe and convenient bicycle/pedestrian access. Provide essential transit stop improvements (i.e., shelters, route information, benches, and lighting) in anticipation of future transit service.

- Daily parking charges for commercial uses (employee parking and retail customers) and free transit passes for residential/commercial uses (commuters and shoppers).

- Employer provides employees with a choice of forgoing subsidized parking for a cash payment equivalent to the cost of the parking space to the employer.

- Provide the minimum amount of parking required.

- At industrial and commercial land uses, all forklifts, “yard trucks,” or vehicles that are predominately used on-site at non-residential land uses shall be electric-powered or powered by biofuels (such as biodiesel [B100]) that are produced from waste products, or shall use other technologies that do not rely on direct fossil fuel consumption.

- Complete streets to encourage bicycle and pedestrian traffic:

- Bike lanes and pedestrian sidewalks on both sides of streets;
- Reduce or eliminate physical barriers between residential and non-residential uses that impede bicycle or pedestrian circulation; and
- Traffic calming features such as traffic circles.

- Non-residential projects provide plentiful short-term and long-term bicycle parking facilities to meet peak-season maximum demand.
- Non-residential projects provide “end-of-trip” facilities, including showers, lockers, and changing space.
- Long-term bicycle parking is provided at apartment complexes or condominiums without garages.

In consultation with SMAQMD, a 28.4% reduction will be achieved through implementation of the above-mentioned reduction measures within the context of projects proposed under the Specific Plan, as deemed feasible by the City of Rancho Cordova. This mitigation, in combination with existing and future regulatory measures developed under AB 32, would reduce GHG emissions associated with the operation of development within the SPA under the selected action alternative. The feasibility of potential GHG reduction measures shall be evaluated at the time that projects within the SPA are proposed in order to allow for ongoing innovations in GHG reduction technologies, as well as incentives created in the regulatory environment.

Implementation: The project applicants for any particular discretionary development application.

Timing: Before approval of final maps and/or building permits for all project phases requiring discretionary approval.

Enforcement: City of Rancho Cordova Community Development Department in consultation with SMAQMD.

BIM, CS, ID

Construction

The types of emissions-generating construction activities that would occur under the Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives would be similar to those that would take place under the other action alternatives. Construction-generated GHG emissions were modeled in URBEMIS and are presented in Table 3.4-1. Refer to Appendix N for a detailed summary of the URBEMIS modeling assumptions, inputs, and outputs.

GHG emissions from construction during the 20-year buildout of the Biological Impact Minimization Alternative would be approximately 13,035 MT CO_2, which is less than estimated for the Proposed Project Alternative. GHG emissions from construction during the 20-year buildout of the Conceptual Strategy Alternative would be approximately 13,867 MT CO_2, which is less than estimated for the Proposed Project Alternative. As shown in Table 3.4-1, estimated GHG emissions from construction during the 20-year buildout of the Increased Development Alternative would be approximately 18,597 MT CO_2, which is more than estimated for the Proposed Project Alternative. These values account for exhaust emissions of GHGs that would be generated by heavy-duty equipment, haul trucks, and vehicle trips. A new regime of regulations is expected to come into place under AB 32 and existing regulatory efforts will help reduce GHG emissions generated by construction activity throughout the state.

Operation

As shown in Table 3.4-1, estimated annual GHG emissions associated with operation of the land uses proposed under the Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives would total approximately 70,953 and 86,465, and 104,149 MT CO_2e/year, respectively.

The annual CO_2e emissions in Table 3.4-1 are representative of each alternative's GHG emissions, and are higher than what would likely occur. Mobile-source emissions, which are estimated to be 56–62% of the total operational emissions (depending on which action alternative is selected), take into account the Pavley and LCFS GHG reductions (see "Analysis Methodology" section above), but are also based on the VMT and trip rates generated by the traffic study, which are somewhat conservative. The estimate of indirect GHG emissions related to electricity consumption, the second largest category of operational GHG emissions shown in Table 3.4-1, does not account for reductions that will result from future regulatory changes under AB 32, such as the alternative-energy mandate of SB 107, which would be fully implemented before full buildout of the Proposed Project and the other four action alternatives. Additionally, SB 1368 will require more stringent emissions performance standards for new power plants – both in-state and out-of-state – that will supply electricity to California consumers. Lastly, rates of energy consumption will be further reduced with implementation of CalGreen, which was drafted, in part, to improve energy efficiency and conserve water and will require increasing levels energy efficiency in comparison to Title 24 building standards.

Further reductions are also expected from other regulatory measures that will be developed under the mandate of AB 32, as identified and recommended in ARB's Scoping Plan (ARB 2008). In general, the Scoping Plan focuses on achieving the state's GHG reduction goals with regulations that improve the efficiency of motor vehicles and the production (and consumption) of electricity. Even without project-specific mitigation, the rate of GHG emissions from development under the Proposed Project and the other four action alternatives are projected to decrease in subsequent years as the regulatory environment progresses under AB 32. Additionally, new technology improvements may become available or the feasibility of existing technologies may improve.

Based on the GHG emissions estimates, without the application of statewide reduction measures and project design features or mitigation to reduce total emissions by at least 28.4%, implementation of these alternatives would result in a cumulatively considerable contribution to a **significant** cumulative impact related to long-term operational generation of GHGs. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measures 3.2-1a, 3.4-1a, and 3.4-1b.

Level of Impact with Mitigation – All Action Alternatives

In addition to the above described estimates of 2032 emissions at buildout of the project, this EIR/EIS also includes a scenario comparison for the purposes of characterizing cumulative significance. This analysis allows a comparison of the GHG reductions from statewide measures and project design features to the statewide emissions reduction needed to achieve the AB 32 emissions mandate. This analysis compares the project, as if it were built out according to 2005 regulations (when AB 32 was being developed) to the project, as if built out according to regulations as they would apply in 2020, taking into account project design features that reduce GHG emissions. Buildout of the five action alternatives under 2005 regulations would result in annual emissions ranging from approximately 82,000 to 142,000 MT CO_2e. Considering project design features and statewide measures as they would apply to a fully built out SPA in 2020, annual emissions would range from approximately 59,000 to 100,000 MT CO_2e. Please see Appendix N for additional details.

There were several steps involved in this quantified estimate of the benefits of statewide measures and project design features. This included an examination of energy and natural gas consumption, both for existing and forecast conditions. Since electricity is used to move water, a close examination of water demand was also included as a part of this work effort. Analysis of locally relevant energy, natural gas, and water demand, along with population projections allows GHG estimates for statewide measures to be applied to this project. Since the transportation sector is the most important source of GHG emission for this and most development plans and projects, an analysis of VMT by "speed bin" was important to both the estimate of GHG emissions and the quantification of statewide measures and project design features. (Speed bins are used to group VMT according to the speed at which they occur). VMT was also broken out into different types of vehicles in the fleet, such as automobiles, light-duty trucks, and other vehicle types. Based on the aforementioned information, as well as locally specific emission factors, it is possible to estimate the effectiveness of key statewide and regional GHG reduction measures. This includes Pavley vehicle emission standards, the Low Carbon Fuel Standard, SMUD's provision of cleaner energy sources and voluntary compliance with the Renewable Portfolio Standard, water use efficiency, energy efficiency (natural gas), and energy efficiency (electricity). Statewide measures would achieve annual reductions of between approximately 19,000 and 33,000 MT CO_2e, depending on the action alternative. Please see Appendix N for more details.

In addition to statewide measures, certain project design features that would also reduce GHG emissions associated with buildout of the action alternatives. While construction mitigation measures and other operational mitigation measures would also reduce GHG emissions, it is not possible at this time to develop numeric estimates for the benefits of all mitigation measures. Project design features that were specifically analyzed for their reduction potential are correlated with measures included in the SunCreek AQMP. These include: bicycle parking (AQMP Measures 1 and 6); end of trip facilities (AQMP Measures 2); pedestrian network (AQMP Measure 5); traffic calming (AQMP Measure 9); office/mixed-use density (AQMP Measure 15); residential density (AQMP Measure 18); and suburban mixed use (AQMP Measure 23). Please see Appendix M for more details on the AQMP.

The reduction measures/project design features that were quantified also correlate with mitigation measures for which quantification guidance is provided in CAPCOA's 2010 document, *Quantifying Greenhouse Gas Mitigation Measures.* This document, which provides guidance on quantification and compiles a large amount of empirical research and publications in academic journals, was used to estimate GHG reductions from project design features. While there are other measures included in the AQMP that would also reduce GHG emissions, there was not adequate or detailed enough information available as of the time of the writing of this document to provide quantified estimates of the effect of mitigation. Please refer to Table 3.4-1, which summarizes the benefits of statewide measures and project design features.

For the No USACE Permit Alternative, it is estimated that statewide measures, design features, and mitigation measures would reduce emissions by at least 28.4%. If design features and mitigation, as well as statewide measures (including LCFS, Pavley I, the Renewables Portfolio Standard, energy efficiency measures, and water use efficiency statewide measures) are considered, GHG emissions attributable to buildout of the Proposed Project would be reduced by 29.1% (see Appendix N for more details).

If design features and mitigation, as well as statewide measures (including LCFS, Pavley I, the Renewables Portfolio Standard, energy efficiency measures, and water use efficiency statewide measures) are considered, GHG emissions attributable to buildout of the Biological Impact Minimization, and Conceptual Strategy, and Increased Development Alternatives would be reduced by 28.3%, 28.3%, and 28.3% respectively (see Appendix N for more details). Total construction emissions were included also in this calculation (amortized over an anticipated 40-year project life). Because the total GHG emissions associated with project operations under the Biological Impact Minimization, and Conceptual Strategy, and Increased Development Alternatives would be considered substantial, and because they would not achieve at least a 28.4% reduction, this represents a **cumulatively considerable** incremental contribution to a **significant** cumulative impact related to long-term operational generation of GHGs. ***[Similar]***

By acknowledging that the regulatory environment will continue to progress and that new GHG reduction technologies will continue to be innovated over time, Mitigation Measures 3.4-1a and 1b require the implementation of mitigation measures that are appropriate and feasible for projects developed in the SPA at the time projects are proposed. Although Mitigation Measures 3.4-1a and 1b would require the implementation of all feasible mitigation measures, it is unknown at the time of writing this document whether the selected measures, in combination with potential GHG offsets and other GHG reductions realized from the regulatory environment that exists during buildout of the SPA, would reduce GHG emissions in a way that is consistent with the significance threshold used in this document. This is particularly true for public buildings, such as schools, that would be built within the SPA, but would not necessarily be subject to the same mitigation measures as other types of developments.

As the preceding discussion suggests, much of the difficulty in achieving GHG reductions through measures imposed by the City reflects the reality that the vast majority of GHG emissions associated with the Proposed Project and the other four action alternatives would be attributable to the combustion of fossil fuels, either in motor vehicles or in electricity-generating power plants.

Based on the Scoping Plan adopted by ARB on December 11, 2008, it is reasonable to expect that the State will make substantial strides in changing the make-up of transportation fuels and power plant fuels to achieve compliance with AB 32. Given the long period of build-out of the project, AB 32 should be effective in reducing GHG emissions from vehicles and power plants during the period of time in which the City approves the vast majority of development entitlements comprising the Proposed Project or the other four action alternatives. As regulations and policies gradually become effective in reducing GHG emissions, the task of achieving the relevant significance threshold should become potentially attainable. However, the precise level of reductions is difficult to calculate for all phases of development. In addition, CEQA Guidelines Section 15091(a)(2) provides that lead agencies may not rely upon mitigation within the responsibility of another public agency. In order to avoid adverse effects related to global climate change, GHG reduction activities are required by nations, states, public sector agencies, and private sector entities that are not within the jurisdiction or control of the City. In particular, the GHG reduction measures under AB 32 are largely controlled by the State agencies. Given the uncertainties in regulatory actions by other agencies, to be conservative, this EIR/EIS concludes that the incremental contribution of the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to long-term operational GHG emissions is **cumulatively considerable** and **significant and unavoidable**.

3.4.2 IMPACTS ON THE PROJECT FROM GLOBAL CLIMATE CHANGE

INTRODUCTION

This section analyzes the potential impact of global climate change on the project (e.g., effects of increased sea levels, reduced snow pack). Because the potential impacts of global warming have only recently been realized, firm data, commonly accepted thresholds for significance, and firm conclusions are not available. This section therefore draws from a range of studies that analyze global and regional patterns and trends. Given the uncertainties in climate change modeling and prediction there are few or no viable models or studies devoted specifically to the project vicinity. Therefore, in order to increase the data set of information about potential regional changes, some of the studies relied on analyze climate for the entire Central Valley, including both the Sacramento and San Joaquin Valleys.

Since there are no formally accepted methodologies, a lead agency must use its best efforts to find out and disclose all that it reasonably can about the potential adverse environmental effects of a proposed project or on a proposed project. However, the analysis cannot rely on speculation. Speculation that is based on unspecified and uncertain future effects that cannot reasonably be evaluated cannot result in verifiable analyses. Furthermore, such analysis could mislead the decision makers and the public. As indicated in the State CEQA Guidelines, “If after a thorough investigation, an agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact” (State CEQA Guidelines CCR Section 15145).

The following analysis is based on available information and projections applicable to estimating the types of effects that may occur. While some effects of global climate change are reasonably foreseeable, the extent to which many of these effects would manifest themselves and the potential of other effects to occur, remain speculative. In the interests of fully informing the decision makers, many of the potential effects that are subject to a high degree of speculation are discussed in the following evaluation, despite the fact that it would be too speculative to draw a conclusion as to their significance. The discussion herein focuses on the potential effects of climate change on the project, rather than the potential of the project to contribute to global climate change.

Although there is a strong scientific consensus that global warming/global climate change 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. Scientists have identified several ways in which global climate change could alter the physical environment in California (Kiparsky and Gleick 2005, Roos 2005, California Department of Water Resources [DWR] 2006). These include:

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

The changes listed above may translate into a variety of other issues and concerns, such as:

- reduced agricultural production as a result of changing temperatures and precipitation patterns;
- changes in the composition, health, and distribution of terrestrial and aquatic ecosystems;
- reduced hydroelectric energy production caused by changes in the timing and volume of runoff; and
- reduced availability of energy because of greater demands associated with increased temperatures.

However, this evaluation of the effects of global climate change on the project does not address climate change associated with energy supply for the following reasons:

- There are many potentially wide-ranging direct and indirect effects of global climate change, such as potential reductions in hydroelectric energy production. These reductions could result from changes in the timing and volume of runoff that would cause reductions in the generation of electricity. However it is too speculative to determine that these potential changes would affect the project because they are both geographically remote and the impact on overall energy supply and markets is unknown. Also, potential changes may be addressed or corrected by other entities (e.g., energy providers increasing generation capacity to meet the increased demand that is not specifically associated with the project; greater development and use of alternative energy sources such as solar to offset capacity losses); and

- The specific measures that would be implemented to address more wide-ranging direct and indirect effects of global climate change cannot be reasonably projected at this time.

This analysis does not suggest that the project would see no effect related to energy supply. Rather, any effects would be the same at the project vicinity, as elsewhere in the county, region, state, nation, and world, and would not result in specific unique impacts in the project vicinity.

This analysis focuses on the effects of global climate change that might have a direct, reasonably foreseeable effect on physical conditions in the project vicinity. Therefore, this analysis gives greatest consideration to climate-change data with more consistency in projections of future conditions, and thus a probability for a greater likelihood of occurring within a reasonable time frame (i.e., approximately 100 years).

Because the impacts of global change would be similar within a regional or local area, this analysis assumes that regardless of whether the No Project, No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, or Increased Development Alternatives were implemented, the impact on the project would be substantially similar.

INFORMATION SOURCES

Information on the current state of the science surrounding climate change was derived from research papers, technical memoranda, literature summaries, and studies, including the following:

- United Nations Intergovernmental Panel on Climate Change documents *Climate Change 2001: The Scientific Basis* (IPCC 2001a); *Climate Change 2001: Synthesis Report* (IPCC 2001b); and *Climate Change 2007: The Physical Basis. Summary for Policymakers* (IPCC 2007);

- *California Water Plan Update 2005* (Bulletin 160-05) (DWR 2005a) and accompanying papers *Climate Change and California Water Resources: A Survey and Summary of the Literature* (Kiparsky and Gleick 2005) and "Accounting for Climate Change" (Roos 2005);

- *Progress on Incorporating Climate Change into Planning and Management of California's Water Resources, Technical Memorandum Report* (DWR 2006); and

- published reports on aspects of climate change and associated effects (see Chapter 5, "References," of this EIR/EIS for a listing of all information sources cited in this section).

CHARACTERIZATION OF CLIMATE CHANGE IMPACTS

This section summarizes the current scientific perspective of climate change and associated effects, particularly those that could affect the project. Information is provided for each effect of climate change considered in this document, consisting of:

- increased temperature;
- precipitation volume, type, and intensity;
- runoff volume and timing;
- water supply;
- sea level rise;
- water quality changes; and
- agricultural changes.

For each climate change effect there is a discussion of:

- status of current scientific information and data about past trends;

- projected future changes and the accuracy and variability of modeling results, including identification of results presumed too speculative for conclusive analysis; and

- potential for the environmental effects of climate change to affect the Proposed Project Alternative, based both on the certainty or uncertainty of modeling results and on the physical nature of the effect.

This information is used in this section to consider and evaluate potential environmental impacts of future climate change on the project.

Background

Theories about climate change and global warming existed as early as the late 1800s. It was not until the later 1900s that understanding of the Earth's atmosphere had advanced to the point where many atmospheric and climate scientists began to accept that the Earth's climate is changing (IPCC 2001a, 2001b; DWR 2006).

In recent years, the scientific consensus has broadened to consider increasing concentrations of GHGs, attributable to anthropogenic (human) activities, as a primary cause of global climate change. The United Nations IPCC predicts that changes in the Earth's climate will continue through the 21st century and that the rate of change may increase significantly in the future because of the growing population and associated increase in human activity (IPCC 2001b, 2007). Recent studies confirm the existence of climate change, and emphasize the occurrence of impacts in the next 20–50 years (Backlund, Janetos, and Schimel 2008), but the scope and rate of change remains uncertain.

In recent years, the issue of global climate change has had an increasing role in scientific and policy debates over multiple environmental topics such as land use planning, transportation planning, energy production, habitat and species conservation, use of ocean resources, and agricultural production. Of particular concern are the existing and potential future effects of global climate change on hydrologic systems and water management (e.g., domestic water supply, agricultural water supplies, flood control, water quality). There is evidence that global climate change has already had an effect on California's hydrologic system. For example, historical data indicate a trend toward declining volumes of spring and summer runoff from the Sierra Nevada.

California water planners and managers have been among the first groups in the nation to realize the potential implications of statewide and regional climate change (rather than global-scale changes) on the reliability and safety of their systems. Research and analysis on climate risks facing California water resources began in the early 1980s, and by the end of that decade, state agencies such as the CEC had prepared the first assessments of state GHG emissions and possible impacts on a wide range of sectors. The California Water Plan (Bulletin 160) first addressed climate change in 1993 (DWR 1993). More recently, DWR and the Public Interest Energy Research program of CEC expanded and refined the analysis of climate change effects in California in the 2005 update of the California Water Plan, which explores a wide range of climate impacts and risks, including risks to water resources (Kiparsky and Gleick 2005, Roos 2005). The 2005 update also describes efforts that should be taken to quantitatively evaluate climate change effects for the next Water Plan update (DWR 2005a). DWR has also followed up on these issues with a technical memorandum report that specifically discusses progress on modeling climate change in the state, characterizes the effects of climate change, and incorporates climate change into planning and management of California's water resources (DWR 2006).

Variability in Regional Modeling of Climate Change

Much of the available trend data, modeling, and projections related to climate change are on a global scale. Climate change projections often rely on general circulation models (GCMs). These models develop large-scale scenarios of changing climate parameters, usually comparing scenarios with different concentrations of greenhouse gases in the atmosphere. This information is typically not specific enough to make accurate regional assessments. As a result, more effort has recently been put into reducing the scale and increasing the resolution of climate models through various techniques such as "downscaling" or integrating regional models into the global models (Kiparsky and Gleick 2005, Roos 2005, DWR 2006). However, the level of uncertainty related to regional climate change is generally higher than that related to global projections because these current methodologies add uncertainty.

Variability in the results of climate change modeling is largely based on which global climate model is used, what inputs are selected for the model (world population increases and greenhouse gas emissions), and how the model is downscaled to provide region-specific data. For example, in DWR's report *Progress on Incorporating Climate Change into Management of California's Water Resources, Technical Memorandum Report* (DWR 2006), four scenarios projecting regional climate change were selected, consisting of combinations of two different global climate models and two different emissions scenarios. These four scenarios provide temperature results ranging from weak warming to relatively strong warming, and precipitation results ranging from modest reductions to weak increases (DWR 2006).

It should be remembered that results of climate change modeling, particularly for regional models, are not specific, quantified predictions. There is a lot of uncertainty about the magnitude of climate change that will occur during this century. It is unlikely that this level of uncertainty will be resolved in the foreseeable future (Dettinger 2005a). Therefore, effects on the environment anticipated under various climate change models should be considered as general projections of potential future conditions, with actual environmental effects likely falling within the range of results provided by a variety of model outputs.

Temperature

Status and Trends

The Earth's climate has had periods of cooling and warming in the past. Significant periods of cooling have been marked by massive accumulations of sea- and land-based ice extending from the Earth's poles to as far as the middle latitudes. Periods of cooling have also been marked by lower sea levels because of the accumulation of water as ice and the cooling and contraction of the Earth's oceans. Periods of warming caused recession of the ice toward the poles, warming and thermal expansion of the Earth's oceans, and rise in sea levels (DWR 2006, IPCC 2007).

The potential for human-induced changes in the Earth's temperature has been tied to increased concentrations of GHGs in the atmosphere, caused primarily by the production and burning of fossil fuels. The primary gases of concern are carbon dioxide, methane, and nitrous oxide (IPCC 2001a, 2001b, 2007). Average temperatures in the Northern Hemisphere appear to have been relatively stable from about the year 1000 to the mid-1800s, based on temperature proxy records from tree rings, corals, ice cores, and historical observations (IPCC 2001a). However, there is a level of uncertainty related to proxy temperature records, especially those extending far back into the past.

The IPCC stated that the Earth's climate has warmed since the preindustrial era and that it is very likely that at least some of this change is attributable to the activities of humans (IPCC 2007). Global average near-surface air temperatures and ocean surface temperatures increased by 0.74 °C ± 0.18°C (1.33°F ± 0.32°F) during the 20th century (IPCC 2007).

Temperature measurements, apparent trends in reduced snowpack and earlier runoff, and other evidence such as changes in the timing of blooming plants indicate that temperatures in California and elsewhere in the western United States have increased during the past century (National Oceanic and Atmospheric Administration [NOAA] 2005, Mote et al. 2005, Cayan et al. 2001).

Projections

Modeling results from GCMs are consistent in predicting increases in temperatures globally with increasing concentrations of atmospheric GHGs resulting from human activity. As discussed above, climate change projections can be developed on a regional basis using techniques to downscale from the results of global models (although increased uncertainty results from the downscaling). One relatively large group of model projections for California that was recently examined provides a temperature rise of about 2.5 to 9°C (4.5 to 16.2°F) for Northern California by 2100. An analysis of the distribution of the projections generally showed a central tendency at about 3°C (5.4°F) of rise for 2050, and about 5°C (9°F) for 2100 (Dettinger 2005b).

Snyder et al. (2002) produced one of the most refined scale temperature and precipitation estimates to date. Resulting temperature increases for a scenario of doubled carbon dioxide concentrations are 1.4 to 3.8°C (2.5 to

6.8°F) throughout California. This is consistent with the global increases predicted by the IPCC (2001b, 2007). In a regional model of the western United States, Kim et al. (2002) projected a climate warming of around 3 to 4°C (5.4 to 7.2°F). Of note in both studies is the projection of uneven distribution of temperature increases. For example, regional climate models show that the warming effects are greatest in the Sierra Nevada, with implications for snowpack and snowmelt (Kim et al. 2002, Snyder et al. 2002).

Effect on the Project

Based on the results of a variety of regional climate models, it is reasonably foreseeable that some increase in annual average temperatures will occur in California, and in the project vicinity, during the next 100 years. Although a temperature increase is expected, the amount and timing of the increase is uncertain. In general, predictions put an increase in the range of 3 to 5°C (5.4 to 9°F) over the next 50–100 years (Kim et al. 2002, Snyder et al. 2002, Dettinger 2005b).

An increase in average annual temperatures, by itself, would have little effect on the proposed land uses other than adjustments in project operations in response to warmer temperatures, such as increased evapotranspiration rates affecting both detention basin areas and landscaped areas, resulting in an increased irrigation demand, and potentially greater overall energy consumption to meet air conditioning needs.

Effects related to water supply is discussed below. Potential outcomes of increased temperature on a global and regional scale, such as changes in precipitation and runoff, also have a potential to substantially affect physical conditions in the project vicinity. These topic areas are also discussed below.

Therefore, although an increase in annual average temperature is a reasonably foreseeable effect of future climate change, this environmental change alone would have little effect on the project.

Precipitation

Climate change can affect precipitation in a variety of ways, such as by changing the following:

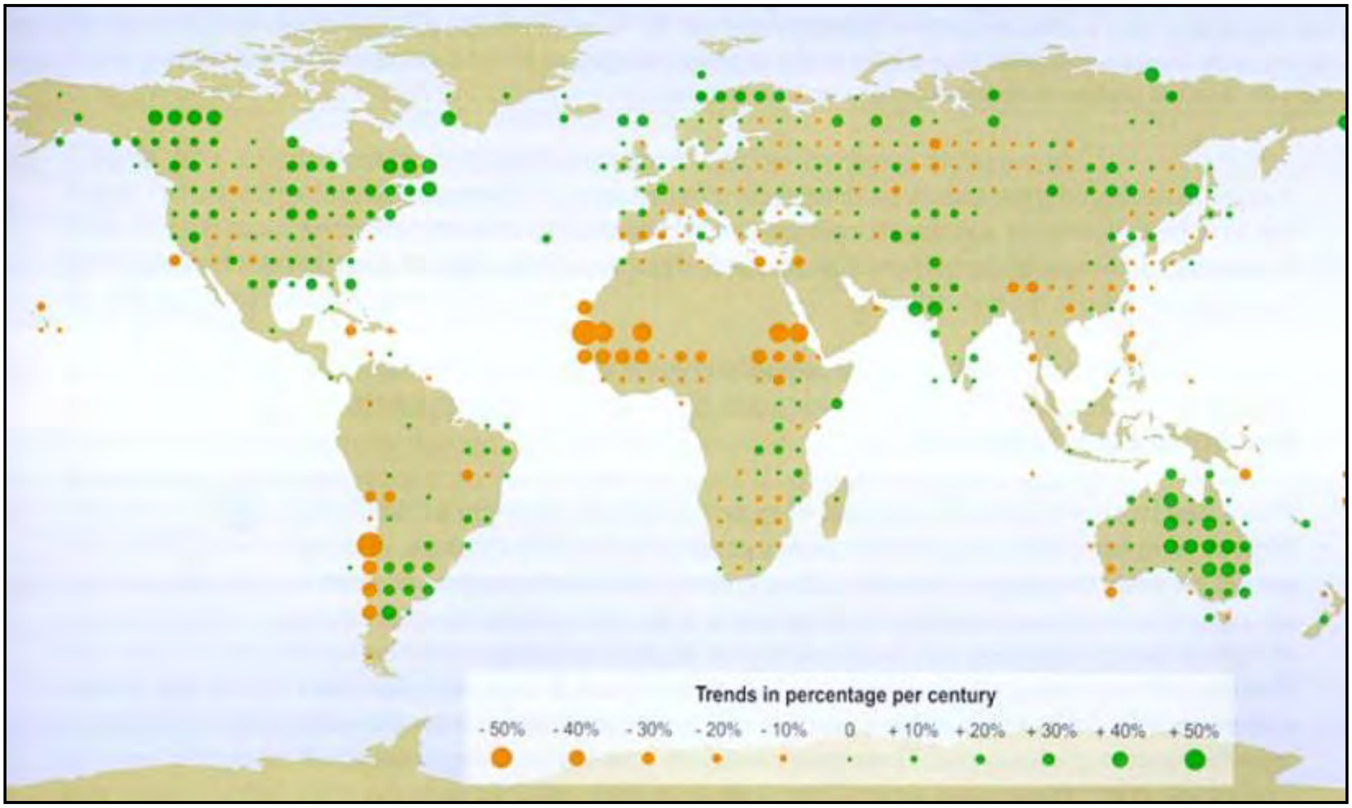
- overall amount of precipitation,
- type of precipitation (rain versus snow), and
- timing and intensity of precipitation events.

Each of these issue areas is discussed below.

Amount of Precipitation

Status and Trends

Worldwide precipitation is reported to have increased about 2% since 1900. While global average precipitation has been observed to increase, changes in precipitation over the past century vary in different parts of the world. Some areas have experienced increased precipitation while other areas have experienced a decline (Exhibit 3.4-2) (IPCC 2001b, 2007; NOAA 2005). An analysis of trends in total annual precipitation in the western United States by the National Weather Service's Climate Prediction Center provides evidence that annual precipitation has increased in much of California, the Colorado River Basin, and elsewhere in the West since the mid-1960s (DWR 2006). In another study evaluating trends in annual November through March precipitation for the western United States and southwest Canada, the data indicate that for most of California and the Southwest there was increasing precipitation during the periods of 1930–1997 and 1950–1997 (Mote et al. 2005).



Source: Adapted by AECOM in 2009 from IPCC 2001

Global Precipitation Trend for 1900–2000 **Exhibit 3.4-2**

Former State Climatologist James Goodridge compiled an extensive collection of longer-term precipitation records from throughout California. These data sets were used to evaluate whether there has been a changing trend in precipitation in the state over the past century (DWR 2006). Long-term runoff records in selected watersheds in the state were also examined. Based on a linear regression of the data, the long-term historical trend for statewide average annual precipitation appears to be relatively flat (no increase or decrease) over the entire record. However, an upward trend in precipitation during the latter portion of the record has been noted, but is not conclusive.

When these same precipitation data are sorted into three regions—northern, central, and southern California—trends show that precipitation in the northern portion of the state appears to have increased slightly from 1890 to 2002, and precipitation in the central and southern portions of the state show slightly decreasing trends. All changes were in the range of 1–3 inches annually (DWR 2006). Thus although existing data indicate some level of change in precipitation trends in California, more analysis is likely needed to determine whether changes in California's regional annual precipitation totals have occurred as the result of climate change or other factors (DWR 2006).

Projections

The IPCC predicts that increasing global surface temperatures are very likely to result in changes in precipitation. Global average precipitation is expected to increase during the 21st century as the result of climate change, based on global climate models for a wide range of greenhouse gas emission scenarios. However, global climate models are generally not well suited for predicting regional changes in precipitation because of the large scale of global projections relative to the small scale of regionally important factors that affect precipitation (e.g., maritime influences, effects of mountain ranges) (IPCC 2001a, 2007).

Therefore, while precipitation is generally expected to increase on a global scale as a result of climate change, significant regional variations in precipitation trends can be expected. Some recent regional modeling efforts conducted for the western United States indicate that overall precipitation will increase (Kim et al. 2002, Snyder et al. 2002), but considerable uncertainty remains because of differences among larger-scale GCMs. Where precipitation is projected to increase in California, the increases are mostly in northern California (Kim et al. 2002, Snyder et al. 2002) and in the winter months.

Various California climate models provide mixed results regarding changes in total annual precipitation in the state through the end of this century. Models predicting the greatest amount of warming generally predict moderate decreases in precipitation, while models projecting smaller increases in temperature tend to predict moderate increases in precipitation (Dettinger 2005b). In addition, an IPCC review of multiple global GCMs indicates that fewer than 66% of the models evaluated agree on whether annual precipitation would increase or decrease for much of the State's area. Therefore, no conclusion on an increase or decrease can be provided (IPCC 2007). Considerable uncertainties about the precise effects of climate change on California (and more specifically Sacramento River hydrology and water resources will remain until there is more precise and consistent information about how precipitation patterns, timing, and intensity will change.

Effect on the Project

Although global climate change models generally predict an increase in overall precipitation on a worldwide scale, there is no such consistency among the results of regional models applied to California. Based on the models used and the input assumptions, both increases and decreases in annual precipitation are projected. There is also variability in the results for different parts of the state. Given the uncertainty associated with projecting the amount of annual precipitation, any conclusion regarding significance of potential effects of climate change on precipitation volumes as they relate to reasonably foreseeable direct effects on physical conditions in the project vicinity would be too speculative to be meaningful.

Type of Precipitation – Snowpack

Status and Trends

California's annual snowpack, on average, has the greatest accumulations from November through the end of March. The snowpack typically melts from April through July. Snowmelt provides significant quantities of water to streams and reservoirs for several months after the annual storm season has ended. The length and timing of each year's period of snowpack accumulation and melting varies based on temperature and precipitation conditions (DWR 2006).

California's snowpack 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 snowpack is usually about 20% of the state's total annual natural runoff and roughly 35% of the state's total usable annual surface water supply. The state's snowpack is estimated to contribute an average of about 15 million acre-feet (maf) of runoff each year, about 14 maf of which is estimated to flow into the Central Valley. In comparison, total reservoir capacity serving the Central Valley is about 24.5 maf in watersheds with significant annual accumulations of snow (DWR 2005b).

California's reservoir managers (including State Water Project [SWP] and Central Valley Project [CVP] facilities) use snowmelt to help fill reservoirs once the threat of large winter and early spring storms and related flooding risks have passed. These systems include water management infrastructure within the Sacramento River watershed, where additional water is stored in reservoirs and used to help meet downstream water demands after flows from snowmelt begin to recede. Some of the annual runoff collected in California's reservoirs is held from one year to the next because California's annual precipitation and snowpack can vary significantly from year to year. There may also be decade-scale variation in precipitation over the Sierra Nevada (Freeman 2002), and possibly other parts of California. Carryover storage can help meet water demand in years when precipitation and runoff is low.

Because the importance of the Sierra Nevada snowpack is tied to both the volume of water it holds and the timing of water releases (spring and early summer), simply assessing the amount of precipitation that falls as snow does not convey the full value of the snowpack and the potential effects of climate change on water supply. Measurements of the amount of Sierra Nevada runoff occurring from April to July are a better indicator of the combined interaction between the volume of the snowpack and the time of year that it melts.

Changes in patterns of runoff reveal declining water storage in the form of snowpack. Between 1906 and 2005, the total water year runoff in the Sacramento Valley rivers (including the Sacramento, Feather, Yuba, and American Rivers) has remained about the same (DWR 2006). However, runoff volume for April–July has declined from approximately 43% of total water-year runoff to approximately 34% of total water year runoff (i.e., has declined about 9% as compared to total year runoff). These values represent "unimpaired" runoff, meaning that the effects of runoff detention in reservoirs are removed. These data indicate that although overall precipitation volumes (represented by runoff amounts) showed no change, more runoff occurred as a result of rain during the winter months, and less runoff could be attributed to the melting of accumulated snowpack during the spring and early summer. These trends suggest less accumulation of snowpack and earlier runoff of snow melt.

Projections

As early as the mid-1980s and early 1990s, regional hydrologic modeling of global warming impacts has suggested with increasing confidence that higher temperatures will affect the timing and magnitude of snowmelt and runoff in California (Gleick 1986, 1997; Lettenmaier and Gan 1990; Lettenmaier and Sheer 1991; Nash and Gleick 1991; Hamlet and Lettenmaier 1999). Over the past two decades, this has been one of the most persistent and well-established findings on the impacts of climate change for water resources in the United States and elsewhere, and it continues to be the major conclusion of regional water assessments (Knowles and Cayan 2002, Barnett et al. in prep.).

By delaying runoff during the winter months when precipitation is greatest, snow accumulation in the Sierra Nevada acts as a massive natural reservoir for California. Despite uncertainties about how increased concentrations of greenhouse gases may affect precipitation, there is very high confidence that higher temperatures will lead to dramatic changes in the dynamics of snowfall and snowmelt in watersheds with substantially more snowfall (Kiparsky and Gleick 2005, DWR 2006). An analysis of the impact of rising temperatures on snowpack conducted by DWR (2006) shows that a 3°C (5.4°F) rise in average annual temperature would likely cause snowlines to rise approximately 1,500 feet. This would result in an annual loss of approximately 5 million acre-feet of water storage in snowpack. Simulations conducted by N. Knowles and D. R. Cayan (Knowles and Cayan 2002) project a loss in April snowpack in the Sierra Nevada of approximately 5% with a 0.6°C (1.1°F) increase in average annual temperature, and approximately 33% loss with a 1.6°C (3.4°F) rise, and an approximately 50% loss in April snowpack with a 2.1°C (4.9°F) average annual temperature rise. Loss of snowpack was projected to be greater in the northern Sierra Nevada and the Cascades than in the southern Sierra Nevada because of the greater proportion of land at the low and mid-elevations in the northern ranges. With a temperature increase of 2.1°C, the northern Sierra Nevada and the Cascades were projected to lose 66% of their April snowpack, while the southern Sierra Nevada was projected to lose 43% of its April snowpack (Knowles and Cayan 2002).

Future predictions confirm that not only will snowpack form a smaller portion of overall precipitation but it will also melt and runoff earlier in the year in the Sacramento watershed and its constituent subbasins (Gleick and Chalecki 1999). This change will occur as overall precipitation will likely increase slightly. These two trends will most likely cause reduced summer flows in the Sacramento River, reduced summer soil moisture and increased winter flows and flood potential. Higher snowlines will cause a greater proportion of winter runoff and earlier snowmelt times will lengthen the duration of peak winter flows and flood potential.

Effect on the Project

Based on the results of a variety of regional climate models and literature, it is reasonably foreseeable that snowpack will be reduced and/or will melt earlier or more rapidly in watersheds that feed the Sacramento River. The SPA is located in the foothills east of the Sacramento Valley and receives snow very rarely. Consequently, changes in snowfall patterns would not directly affect precipitation in the SPA.

However, changes in snowpack could affect the project indirectly by altering the timing and volume of runoff that eventually feeds into the SPA and into waterways supplying water to the project. Impacts to snowpack and associated runoff affecting the Sacramento River watershed are the most salient to proposed land uses in the project vicinity. The runoff sources can be divided into two categories: (1) direct rainfall-fed surface runoff accumulating in channels; and (2) released water from upstream reservoirs that is conveyed by the channels and will be used for groundwater recharge. The first source, direct surface runoff, will vary with large-scale regional changes in precipitation patterns. Because much of the naturally occurring runoff relevant to water supplies for the project originates as rainfall rather than snowfall (much of the Sacramento River watershed occurs in the Sacramento Valley itself and thus below the snowline), changes to the timing and magnitude of naturally occurring rainfall patterns will follow regional changes associated with climate change in the central and northern Sierra Nevada. The second source, released and/or purchased waters stored in upstream reservoirs, will largely depend on regional annual average precipitation accumulations. The management of upstream reservoirs may need to be altered to account for seasonal variations in precipitation type and intensity. However, the total water volumes stored in upstream reservoirs is largely tied to regional trends of annual average precipitation amounts. The predicted shift towards greater precipitation with a larger proportion of rainfall relative to snow will require greater upstream management in reservoirs and other flood control devices to maintain the current level of flood protection. Given the complex system of upstream water management, the impact of predicted climate changes on the project is speculative, but flood potential will probably increase if water management strategies remain the same. However, given that the magnitude and timing of the increase in winter runoff and the associated changes in reservoir use that may occur, the exact impact on the Proposed Project Alternative is speculative. Based on the uncertainty of projected changes it is not feasible or useful to mitigate anticipated changes in current planning.

Timing and Intensity of Precipitation Events

Status and Trends

Variability and extreme weather events are a natural part of any climatic system. The extent of climatic stability or variability is dependent in large part on the time frame examined. Climatic conditions may be characterized as relatively stable over periods of hundreds or thousands of years, but within that time frame there may be severe droughts or flood events that vary widely beyond the overall average condition. Paleoclimatic evidence from tree rings, buried stumps, and lakebed sediment cores suggests that in California the past 200 years have been relatively wet and relatively constant when compared with older records (DWR 2006). These older records reveal greater variability than the historical record, in particular in the form of severe and prolonged droughts, but are not likely to be as reliable as more recent records. Most identified climatic averages and extremes for California are based on the historical climate record since 1900, and cannot be considered fully representative of past or future conditions (DWR 2006).

Extreme weather events are expected to be one of the more important indicators of climate change. Phenomena such as the El Niño/Southern Oscillation, which is the strongest natural interannual climate fluctuation, affect the entire global climate system and the economies and societies of many regions and nations. Direct effects of this climate fluctuation occur in California. The El Niño/Southern Oscillation phenomena for example, strongly influences storms and precipitation patterns. It is unclear how increases in global average temperatures associated with global warming might affect the El Niño cycles. However, the strong El Niños of 1982–83 and 1997–98 and associated flood events, along with the more frequent occurrences of El Niños in the past few decades, have forced researchers to try to better understand how human-induced climate change may affect interannual climate variability (Trenberth and Hoar 1996, Timmermann et al. 1999).

In addition to possible long-term changes in precipitation trends, increased variability of annual precipitation is a possible outcome of climate change. Based on a statistical analysis of California precipitation records, there appears to be an upward trend in the variability of precipitation over the 20th century, with variability values at the end of the century about 75% larger than at the beginning of the century. This indicates that there tended to be more extreme wet and dry years at the end of the century than there were at the beginning of the century (DWR 2006). However, as stated above, paleoclimatic evidence suggests that weather patterns in California have been relatively constant over the last 200 years, which identifies the variable weather patterns toward the latter part of this period as more pronounced. As identified previously in the "Amount of Precipitation" discussion, there has been little change in the average amount of annual precipitation in California over the last 100 years. Therefore, the increased variability between wet and dry years in recent decades appears to oscillate around the same annual average established over a longer time frame.

Projections

While variability is not well modeled in large-scale GCMs, some modeling studies suggest that the variability of the hydrologic cycle increases when mean precipitation increases, possibly accompanied by more intense local storms and changes in runoff patterns (DWR 2006). However, the results of another long-standing model point to an increase in incidents of drought, resulting from a combination of increased temperature and evaporation along with decreased precipitation (DWR 2006). Based on the first model mentioned, this decrease in precipitation would lead to reduced variability in hydrologic cycles.

A study that analyzed 20 GCMs currently in use worldwide suggests that the West Coast may be less affected by extreme droughts than other areas; instead, the region would experience increased average annual rainfall (Meehl et al. 2000). A separate study that reviewed several GCM scenarios showed increased risk of large storms and flood events for California. Conflicting conclusions about climatic variability and the nature of extreme weather events (e.g., droughts, severe storms, or both) support the need for additional studies with models featuring higher spatial resolution (Kiparsky and Gleick 2005, DWR 2006).

Effect on the Project

Although various climate change models predict some increase in variability of weather patterns and an increasing incidence of extreme weather events, there is no consistency among the model results, with some predicting increased incidents of droughts and others predicting increased frequency of severe storm events. Given the uncertainty associated with projecting the type and extent of changes in climatic variability and the speculative nature of predicting incidents of extreme weather events, the effect on the project of changing patterns of storms and other extreme weather remains unclear, and the attempt to reach a significance conclusion would be speculative.

Runoff

Status and Trends

Runoff is directly affected by changes in precipitation and snowpack (see discussions above). Changes in both the amount of runoff and in seasonality of the hydrologic cycle have the potential to greatly affect the heavily managed water systems of the western United States.

As described in the previous discussion of snowpack, data indicate that although overall precipitation volumes (represented by runoff amounts) showed no change, more runoff occurred as a result of rain during the winter months, and less runoff could be attributed to the melting of accumulated snowpack during the spring and early summer (DWR 2006).

Projections

Detailed estimates of changes in runoff as a result of climate change have been produced for California using regional hydrologic models. With input of anticipated, hypothetical, and/or historical changes in temperature and precipitation in to models that include realistic small-scale hydrology, modelers have consistently seen substantial changes in the timing and magnitude, which can be attributed to runoff resulting from projected changes in climatic variables (Kiparsky and Gleick 2005). Model results indicate that as temperatures rise, a declining proportion of total precipitation falls as snow, more winter runoff occurs, and remaining snow melts sooner and faster in spring (Knowles and Cayan 2002, Gleick and Chalecki 1999). In some basins, spring peak runoff may increase; in others, runoff volumes may shift to earlier in the spring and winter months (Kiparsky and Gleick 2005, DWR 2006). If snowpack declines, it is also possible that the incidence or severity of flood events resulting from “rain on snow” conditions could also decline.

As indicated above, hydrology in the lower reaches of the Sacramento Valley is highly dependent on the interaction between Sierra Nevada snowpack, runoff, and management of reservoirs. Potential changes made to the amount of reservoir space retained for flood storage, retained annual carryover volumes, and other reservoir management factors in response to altered Sierra Nevada runoff patterns could substantially alter how those runoff patterns are experienced in downstream in the vicinity of the project vicinity. It is also possible that as climate change continues to progress over the next 50–100 years, new water storage projects (e.g., on-stream or off-stream storage reservoirs, expanding capacity at existing reservoirs) may be put in place to capture additional Sierra runoff. Additional storage capacity could assist in buffering runoff patterns in the lower river reaches from altered flow regimes in higher elevations.

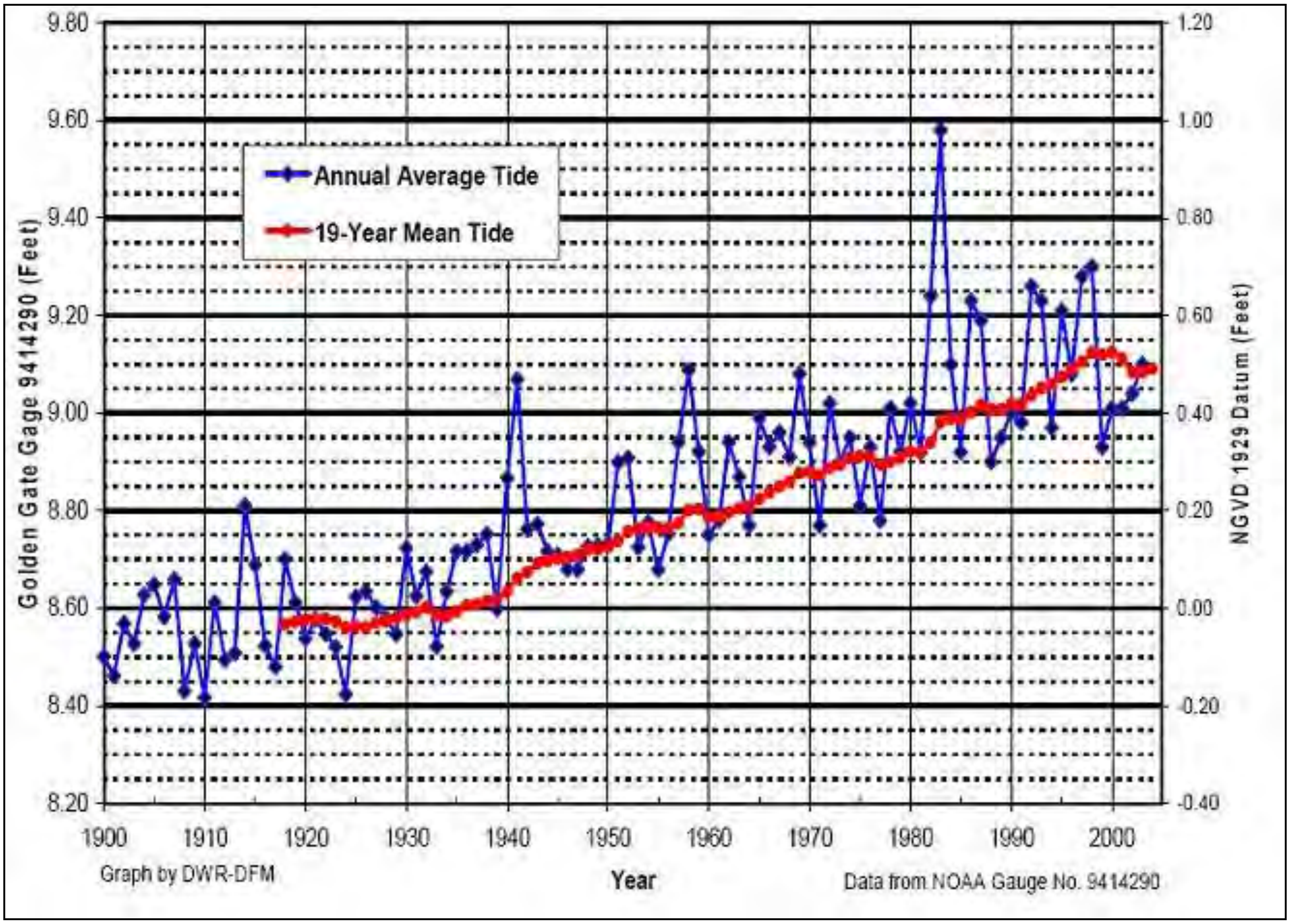
Effect on the Project

Although various climate change models consistently predict reduced spring/summer runoff in the Sierra Nevada as a result of altered snowpack conditions, there is a great deal of uncertainty regarding how these changes would affect runoff patterns in the Sacramento Valley and consequently water dependent land uses in the Sacramento Valley and foothills. Potential modifications in management regimes of existing reservoirs, such as reducing retained annual carryover volumes to increase space available for flood storage, could buffer the Sacramento River and adjacent land uses from changes to runoff patterns at higher elevations. The potential for creation of new water storage capacity, such as on- or off-stream storage reservoirs or expanding capacity at existing reservoirs could also reduce the effects of altered runoff patterns. Given the integrated nature of the water system in California, even increased storage capacity in southern California could benefit the region by allowing reservoirs in northern California to hold less water for domestic or agriculture use and retain more capacity for flood control. Given the uncertainty associated with projecting changes in runoff patterns in water bodies at and upstream of the project vicinity (the Sacramento River watershed is approximately 27,000 square miles, most of which occurs upstream of the project vicinity, and contains numerous subbasins) this potential climate change effect is too speculative to reasonably draw a meaningful conclusion regarding the significance of foreseeable direct effects on physical conditions in the project vicinity.

Sea Level

Status and Trends

One of the major areas of concern related to global climate change is rising sea level. Worldwide average sea level appears to have risen about 0.4 to 0.7 foot over the past century based on data collected from tide gauges around the globe, coupled with satellite measurements taken over approximately the last 15 years (IPCC 2007). Various gauge stations along the coast of California show an increase similar to the global trends. Data specific to the San Francisco tide gauge near the Golden Gate Bridge shows that the 19-year mean tide level (the mean tide level based on 19-year data sets) has increased by approximately 0.5 foot over the past 100 years (Exhibit 3.4-3). Rising average sea level over the past century has been attributed primarily to warming of the world’s oceans and the related thermal expansion of ocean waters, and the addition of water to the world's oceans from the melting of land-based polar ice. Some researchers have attributed most of the worldwide rise to thermal expansion of water, although there is some uncertainty about the relative contributions of each cause (Munk 2002).



Source: Adapted by AECOM in 2009 from DWR 2006

Graph of Annual Average Relative Sea Level and the 19-Year Running Average Sea Level at the Golden Gate Tide Gauge, California, 1900–2003 **Exhibit 3.4-3**

Effect on the Project

Projections

Various global climate change models have projected a rise in worldwide average sea level of 0.3 to 2.9 feet by 2100 (IPCC 2001a). Updated model results provided by the IPCC in 2007 put the range at 0.6–1.9 feet by 2099 (IPCC 2007). The ranges are narrower than in the Third Assessment Report (IPCC 2001a) mainly because of improved information about some uncertainties in the projected contributors to sea level rise (IPCC 2007).

Although these projections are on a global scale, the rate of relative sea level rise experienced at many locations along California's coast is consistent with the worldwide average rate of rise observed over the past century. Therefore, it is reasonable to expect that changes in worldwide average sea level through this century will also be experienced by California's coast (DWR 2006).

A consistent rise in sea level has been recorded worldwide over the last 100 years. Recorded rises in sea level along the California coast correlate well with the worldwide data. Based on the results of various global climate change models, sea level rise is expected to continue. Based on the consistency in past trends, the consistency of future projections, and the correlation between data collected globally and data specific to California, it is reasonably foreseeable that some amount of sea level rise will occur along the California coast over the next 100 years. Although sea level rise is expected to occur, the amount and timing of the increase is uncertain.

Predictions published by the IPCC in 2007 indicate an increase in elevation in the range at 0.6–1.9 feet by 2099 (IPCC 2007).

While sea level rise induced by climate change is reasonably certain, the SPA is located far above (over 100 feet above) sea level, and thus sea level rise would not directly affect proposed land uses within the SPA.

Water Supply

Status and Trends

Several recent studies have shown that existing water supply systems are sensitive to climate change (Wood et al. 1997). Potential impacts of climate change on water supply and availability could directly and indirectly affect a wide range of institutional, economic, and societal factors (Gleick 1997). Residential, industrial, and agricultural land uses all are affected by the cost and security of water supply. Much uncertainty remains, however, with respect to the overall impact of global climate change on future water supplies. For example, models that predict drier conditions (i.e., parallel climate model [PCM]) suggest decreased reservoir inflows and storage and decreased river flows, relative to current conditions. By comparison, models that predict wetter conditions (i.e., HadCM2) project increased reservoir inflows and storage, and increased river flows (Brekke et al. 2004). Both projections are equally probable based on which model is chosen for the analyses (Brekke et al. 2004). Much uncertainty also exists with respect to how climate change will affect future demand on water supply (DWR 2006). Still, changes in water supply are expected to occur and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows (Kiparsky and Gleick 2005; see also Cayan et al. 2006).

Little work has been performed on the effects of climate change on specific groundwater basins or groundwater recharge characteristics (Kiparsky and Gleick 2005). Changes in rainfall and changes in the timing of the groundwater recharge season would result in changes in recharge. Warmer temperatures could increase the period where water is on the ground by reducing soil freeze. Conversely, warmer temperatures could lead to higher evaporation or shorter rainfall seasons, which could mean that soil deficits would persist for longer time periods, shortening recharge seasons. Warmer, wetter winters would increase the amount of runoff available for groundwater recharge. This additional winter runoff, however, would be occurring at a time when some basins, particularly in Northern California, are being recharged at their maximum capacity. Reductions in spring runoff and higher evapotranspiration, on the other hand, could reduce the amount of water available for recharge. However, the specific extent to which various meteorological conditions will change and the impact of that change on groundwater are both unknown. A reduced snowpack, coupled with increased rainfall, could require a change in the operating procedures for California’s existing dams and conveyance facilities (Kiparsky and Gleick 2005).

Projections

DWR’s *Progress on Incorporating Climate Change into Management of California’s Water Resources, Technical Memorandum Report* (2006) focused on climate change impacts on CVP and SWP operations and on the Delta. The results of that analysis suggest several impacts of climate change on overall CVP and SWP operations and deliveries. In three of the four climate scenarios simulated, CVP reservoirs north of the Delta experienced shortages during droughts. DWR (2006) recommends that future studies examine operational changes that could avoid these shortages. At present, DWR concludes, it is not clear whether such operational changes would be insignificant or substantial. Changes in annual average CVP deliveries south of the Delta ranged from increases of about 2.5% for the wetter scenario to decreases of up to 10% for drier scenarios. Future studies will have to address how shortages north of the Delta could affect CVP deliveries south of the Delta. Carryover storage (i.e., water from one year stored into the next year) for the CVP was negatively affected in the drier scenarios and beneficially affected (slightly increased) in the wetter scenario.

The modeling conducted by Gleick and Chalecki (1999) on the Sacramento River Basin strongly suggests that annual levels of water moving through the Sacramento River watershed would increase. While annual volumes of water would increase, summer flows would decrease as a result of projected reductions in snowpack and earlier seasonal melting. Absent any intervention this would result in lower summer surface water flows and higher winter flows. Groundwater recharge may be adversely impacted by lower summer flows, without a commensurate increase because winter recharge rates are already at maximum. Upstream water management structures such as reservoirs could mitigate this by retaining greater winter flows to be released during the summer, thus making for a more constant level of surface water in the Sacramento. The need for adaptive changes in water management infrastructure use suggested by Gleick and Chalecki is confirmed by more recent research.

Tanaka et al. (2006) explored the ability of California's water supply system to adapt to long-term climatic and demographic changes using the California Value Integrated Network (CALVIN), a statewide economic-engineering optimization model of water supply management. The results show agricultural water users in the Central Valley are the most sensitive to climate change, particularly under the driest and warmest scenario (i.e., PCM 2100) predicting a 37% reduction of Central Valley agricultural water deliveries and a rise in Central Valley water scarcity costs by $1.7 billion. Although the results of the study are only preliminary, they suggest that California's water supply system appears "physically capable of adapting to significant changes in climate and population, albeit at a significant cost" (Tanaka et al. 2006). Such adaptation would entail changes in California's groundwater storage capacity, water transfers, and adoption of new technology.

VanRheenen et al. (2004) studied the potential effects of climate change on the hydrology and water resources of the Sacramento-San Joaquin River Basin using five PCM scenarios. The study concluded that most mitigation alternatives examined satisfied only 87 to 96% of environmental targets in the Sacramento system, and less than 80% in the San Joaquin system. Therefore, system infrastructure modifications and improvements could be necessary to accommodate the volumetric and temporal shifts in flows predicted to occur with future climates in the Sacramento-San Joaquin River Basins.

Zhu et al. (2005) studied climate warming impacts on water availability derived from modeled climate and warming streamflow estimates for six index California basins and distributed statewide temperature shift and precipitations changes for 12 climate scenarios. The index basins provide broad information for spatial estimates of the overall response of California's water supply and the potential range of impacts. The results identify a statewide trend of increased winter and spring runoff and decreased summer runoff, as previously indicated by Gleick and Chalecki (1999). Approximate changes in water availability are estimated for each scenario, though without operations modeling. Even most scenarios with increased precipitation result in a decrease in available water. This result is due to the inability of current storage systems to catch increased winter streamflow to offset reduced summer runoff.

Medellin et al. (2006) used the CALVIN model under a high emissions "worst case" scenario, called a dry-warming scenario. The study found that climate change would reduce water deliveries by 17% in 2050. The reduction in deliveries was not equally distributed, however, between urban and agricultural areas. Agricultural areas would see their water deliveries drop by 24% while urban areas would only see a reduction of 1%. There was also a geographic difference: urban scarcity was almost absent outside of southern California.

In 2003, CEC's Public Interest Energy Research (PIER) program established the California Climate Change Center (CCCC) to conduct climate change research relevant to the state. Executive Order S-3-05 called for the CalEPA to prepare biennial science reports on the potential impact of continued climate change on certain sectors of California's economy. CalEPA entrusted PIER and its CCCC to lead this effort. The climate change analysis contained in its first biennial science report concluded that major changes in water management and allocation systems could be required in order to adapt to the change. As less winter precipitation falls as snow, and more as rain, water managers would have to balance the need to construct reservoirs for water supply with the need to maintain reservoir storage for winter flood control. Additional storage could be developed, but at high environmental and economic costs.

Lund et al. (2003) examined the effects of a range of climate warming estimates on the long-term performance and management of California's water system. The study estimated changes in California's water availability, including effects of forecasted changes in 2100 urban and agricultural water demands using a modified version of the CALVIN model. The main conclusions are summarized below.

- A broad range of climate warming scenarios show significant increase in wet season flows and significant decreases in spring snowmelt. The magnitude of climate change effects on water supplies is comparable to water demand increases from population growth in 21st century.
- California's water system would be able to adapt to the severe population growth and climate change modeled. This adaptation would be costly, but it would not threaten the fundamental prosperity of the state, although it could have major impacts on the agricultural sector. The water management costs represent only a small proportion of California's current economy.
- Under the driest climate warming scenarios, Central Valley agricultural users could be especially vulnerable to climate change. Wetter hydrologies could increase water availability for these users. The agricultural community would not be compensated for much of its loss under the dry scenario. The balance of climate change effects on agricultural yield and water use is unclear. While higher temperatures could increase evapotranspiration, longer growing seasons and higher carbon dioxide concentrations could increase crop yield.
- Population growth is expected to be more problematic than climate change in Southern California. Population growth, conveyance limits on imports, and high economic value of water in Southern California, could lead to high use of wastewater reuse and substantial use of seawater desalination along the coast. Due to the integrated nature of water management and competition for water resources this could impact water supply in the Sacramento region.
- Under some wet warming climate scenarios, flooding problems could be substantial. In certain cases, major expansions of downstream floodways and alterations in floodplain land use could become desirable.
- California's water system could economically adapt to all the climate warming scenarios examined in the study. 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 government can help California adapt to population growth and global climate change. However, if these strategies are implemented, the costs of water management are expected to be high and there is likely to be less "slack" in the system compared to current operations and expectations.

Effect on the Project

As described by the projections above, overall, climate change is expected to have a greater effect in Southern California and on agricultural users than urban users in the Central Valley, which includes both the San Joaquin and Sacramento Valleys. For example, for 2020 conditions, where optimization is allowed (i.e., using the CALVIN model), scarcity is not expected to be an issue in the Sacramento Valley for both urban and agricultural users, and generally not an issue for urban users in the San Joaquin and Tulare Basins. Rather, most water scarcity will be felt by agricultural users in Southern California. However, it is expected that Southern California urban users, especially Coachella urban users, will also experience some scarcity. By the year 2050, urban water scarcity there will be almost no water scarcity north of the Tehachapi Mountains, although agricultural water scarcity could increase in the Sacramento Valley to about 2% (Medellin et al. 2006; see also Tanaka et al. 2006 and Lund et al. 2003 for further discussion of global climate change impacts on agricultural uses).

Based on the conclusions of current literature regarding California's ability to adapt to global climate change, it is reasonably expected that over time, the state's water system will be modified to be able to address the projected climate changes, e.g., under dry and/or warm climate scenarios (DWR 2006). Although coping with climate change effects on California's water supply could come at a considerable cost, based on a thorough investigation of the issue, it is reasonably expected that statewide implementation of some, if not several, of the wide variety of adaptation measures available to the state, will likely enable California's water system to reliably meet future water demands. For example, traditional water supply reservoir operations may be used, in conjunction with other adaptive actions, to offset the impacts of global warming on water supply (Medellin et al. 2006; see also Tanaka et al. 2006 and Lund et al. 2003). Other adaptive measures include better urban and agricultural water use efficiency practices, conjunctive use of surface and ground waters, desalination, and water markets and portfolios (Medellin et al. 2006; see also Lund et al. 2003, Tanaka et al. 2006). More costly statewide adaptation measures could include construction of new reservoirs and enhancements to the state's levee system (CEC 2003).
As described by Medellin et al. 2006, with adaptation to the climate, the water deliveries to urban centers are expected to decrease by only 1%, with Southern California shouldering the brunt of this decrease.

Given these projections it is difficult to scale regional and state trends down to predict specific impacts in the project vicinity. The project would rely upon both surface water from the Sacramento River and groundwater pumping at the SPA and in the project vicinity (i.e., Vineyard and Mather groundwater wells) as part of the Sacramento County Water Agency's conjunctive use program. As described above for the discussions of snowpack and runoff, the effect of climate change on the Sacrament River watershed remains uncertain. Different models suggest either an increase or decrease in precipitation. While an increase in precipitation may increase potential surface and groundwater supply, existing storage facilities may need to be expanded to effectively capture and transfer such supplies. Additionally, an increase in precipitation may not effectively increase groundwater recharge if the increase occurs during seasons when aquifers are recharging at maximum capacity. Because there is uncertainty with respect to impacts of climate change on future water availability in California, in terms of whether and where effects will occur, and the timing and severity of any such potential effect, conclusions regarding significance would therefore be too speculative for meaningful consideration.

Water Quality

Status and Trends

Water quality depends on a wide range of interacting variables, such as water temperatures, flows, runoff rates and timing, waste discharge loads, and the ability of watersheds to assimilate wastes and pollutants. Surface water quality in the Sacramento Valley has experienced substantial adverse effects from human activities, including contaminant inputs from urban, industrial, and agricultural sources; and increased temperature from removal of shading vegetation. Historic activities such as gold mining in the nineteenth century created long-term impacts on regional water quality by contributing massive quantities of silt, minerals, and, notably, mercury that has settled into river bottom sediments.

Projections

Climate change could alter numerous water quality parameters in a variety of ways. Higher winter flows could reduce pollutant concentrations (through dilution) or increase erosion of land surfaces and stream channels, leading to higher sediment, chemical, and nutrient loads in rivers (DWR 2006). Increases in water flows could also decrease chemical reactions in streams and lakes, reduce the flushing time for contaminants, and increase export of pollutants to coastal areas (Mulholland et al. 1997, Schindler 1997). Decreased summer flows can exacerbate increases in temperature, increase the concentration of pollutants, increase flushing times, and increase salinity (Schindler 1997, Mulholland et al. 1997). Decreased surface-water flows can also reduce nonpoint-source runoff (Mulholland et al. 1997). Increased water temperatures can enhance the toxicity of metals in aquatic ecosystems (Moore et al. 1997). Increases in water temperature alone are often likely to lead to adverse changes in water quality, even in the absence of changes in precipitation (Kiparsky and Gleick 2005).

A review of potential impacts of climate change on water quality concludes that significant changes in water quality are known to occur as a direct result of short-term changes in climate (Murdoch, Baron, and Miller 2000). The review notes that water quality in ecological transition zones and areas of natural climate extremes is vulnerable to climate changes that increase temperatures or change the variability of precipitation. However, it is also argued that changes in land and resource use will have comparable or even greater impacts on water quality than changes in temperature and precipitation. A separate study concluded that changes in land use resulting from climatic changes, together with technical and regulatory actions to protect water quality, can be critical to future water conditions (Kiparsky and Gleick 2005). The net effect on water quality for rivers, lakes, and groundwater in the future is dependent not just on how climatic conditions might change, but also on a wide range of other human actions and management decisions. The most recent studies identify the likelihood that decreased runoff will interact with higher stream temperatures to exacerbate decreases in water quality (Backlund et. al. 2008:8).

Effect on the Project

Although there are various ways in which climate change could affect water quality, effects could be positive or negative depending on a variety of conditions. In addition, current water quality conditions in regional surface waters depend in large part on human activities, and this would continue into the future. The effects of climate change on water quality could be alleviated by, exacerbated by, or overwhelmed by effects directly related to localized human actions. Given the uncertainty associated with projecting the type and extent of changes in water quality attributable to climate change, including trying to project human activities, this potential climate change effect is too speculative to draw a conclusion regarding the significance of any direct effect on physical conditions in the project vicinity.

CONCLUSION

Seven general categories of potential effects of climate change were evaluated in this section:

- increased temperature;
- precipitation volume, type, and intensity;
- runoff volume and timing;
- water supply;
- sea level rise; and
- water quality.

This analysis concludes that (1) either the climate change effect would not have the potential to substantially affect the project vicinity, or (2) because of significant uncertainty in projecting future conditions related to the climate change effect, it would be too speculative to reach a meaningful conclusion regarding the significance of any reasonably foreseeable direct impact on physical conditions in the project vicinity. Therefore, impacts are too speculative for meaningful consideration.

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3.5 CULTURAL RESOURCES

3.5.1 AFFECTED ENVIRONMENT

ARCHAEOLOGICAL AND ETHNOGRAPHIC SETTING

The earliest well-documented entry and spread of humans into California occurred at the beginning of the Paleo-Indian Period (10,000–6000 years Before Present [B.P.]). Social units are thought to have been small and highly mobile. Known sites have been identified within the contexts of ancient pluvial lake shores and coastlines, as evidenced by such characteristic hunting implements as fluted projectile points and chipped stone crescent forms. Prehistoric adaptations over the ensuing centuries have been identified in the archaeological record by numerous researchers working in the area since the early 1900s, as summarized by Fredrickson (1974) and Moratto (1984). Because of the plentiful resources and a generally temperate climate, the Central Valley was well populated prehistorically and served as the location for some of the more substantial village sites known in California.

Heizer and Fenenga (1939), Beardsley (1948), and others conducted numerous studies that form the core of the current state of knowledge about early archaeology in the upper Central Valley. Little has been found archaeologically that dates to the Paleo-Indian (10,000–6000 B.P.) or Lower Archaic (6000–3000 B.P.) time periods; however, archaeologists have recovered a great deal of data from sites occupied as early as the Middle Archaic Period (3000–1000 B.P.). The lack of sites from earlier periods may have been caused by high sedimentation rates that left the earliest sites deeply buried and inaccessible. During the Middle Archaic Period, the broad regional patterns of foraging subsistence strategies gave way to more intensive procurement practices. Subsistence economies were more diversified, possibly including the introduction of acorn processing technology. Human populations were growing and occupying more diverse settings. Permanent villages that were occupied throughout the year were established, primarily along major waterways. The onset of status distinctions and other indicators of growing sociopolitical complexity mark the Upper Archaic Period (1000 B.P.–A.D. 500). Exchange systems became more complex and formalized. Evidence of regular, sustained trade between groups was seen for the first time.

Several technological and social changes characterized the Emergent Period (A.D. 500–1800). The bow and arrow were introduced, ultimately replacing the dart and atlatl. Territorial boundaries between groups became well established. Distinctions in an individual’s social status could be increasingly linked to acquired wealth. Exchange of goods between groups became more regularized as more goods, including raw materials, entered into the exchange networks. In the latter portion of this period (A.D. 1500–1800), exchange relations became highly regularized and sophisticated. The clamshell disk bead became a monetary unit for exchange, and increasing quantities of goods moved greater distances. Specialists arose to govern various aspects of production and exchange.

In California, the broader time periods are frequently subdivided into more localized patterns. The three patterns found in the project region, well represented in archaeological assemblages in the vicinity of the SPA, are discussed in detail in Moratto (1984) and summarized here. The Windmiller Pattern (3000–1000 B.P.) of archaeological assemblages included an increased emphasis on acorn use and a continuation of hunting and fishing activities. Ground and polished charmstones, twined basketry, baked-clay artifacts, and worked shell and bone were hallmarks of Windmiller culture. Widely ranging trade patterns brought goods in from the Coast Ranges and trans-Sierran sources as well as closer trading partners. Distinctive burial practices identified with the Windmiller Pattern also appeared in the Sierra foothills, indicating possible seasonal migration into the Sierra. The Berkeley Pattern (1000–500 B.P.) represented a greater reliance on acorns as a food source than was seen previously. Distinctive stone and shell artifacts distinguished it from earlier or later cultural expressions. The Berkeley Pattern appears to have developed in the San Francisco Bay Area and was spread through the migration of Plains Miwok Indians. The Augustine Pattern (500 B.P. to the historic era) may have been stimulated by the southern migration of Wintuan people from north of the Sacramento Valley. Their culture was marked by population increases resulting from more intensive food procurement strategies, as well as a marked change in burial practices, increased trade activities, and a well-defined ceramic technology.

Native Americans of the western Sierra Nevada foothills lived in relatively permanent settlements, visiting the higher reaches primarily during the summer months (Moratto 1984). Permanent settlements ranged from a handful of people to several hundred; they tended to be situated near water, preferably on slightly raised ground. A major village might include dwellings, granaries, sweat houses, a headman's house and dance house, or other ceremonial structures. The people of the villages would gather a wide variety of fruits, nuts, greens, bulbs, roots, and seeds, processing and storing many of them for winter. Fish, birds, deer, small game, and many other animals were hunted.

The SPA lies near the geographic boundary of the prehistoric spheres of influence of the Nisenan (sometimes referred to as the Southern Maidu) and Plains Miwok. The Nisenan belong to the Penutian linguistic family. Kroeber (1925) recognized three Nisenan dialects—Northern Hill Nisenan, Southern Hill Nisenan, and Valley Nisenan. The Nisenan territory included the drainages of the Yuba, Bear, and American Rivers and the lower drainages of the Feather River. The Nisenan ranged from the Sierra Nevada crest to nearly sea level at the Sacramento River. Plains Miwok groups occupied the lower reaches of the Mokelumne and Cosumnes rivers and both banks of the Sacramento River from Rio Vista to Freeport (Levy 1978); it is likely that both the Plains Miwok and the Valley Nisenan exploited resources found in the project vicinity.

The Plains Miwok, who like the Nisenan were members of the Penutian linguistic groups, were oriented toward collection of plant foods. They augmented their diet with fishing and hunting, which focused on small mammals and birds (Peak & Associates 1997). Granaries capable of holding 2 years' supply of food were constructed by family groups. Both Miwok and Nisenan villages were located on natural high ground near streams; a series of smaller villages and camps looked to the larger settlements for leadership.

Substantial Native American contact with Europeans in the vicinity of the SPA came late. Limited encounters with explorers and trappers during the early 19th century left the Hill Nisenan and Washoe relatively unaffected (Wilson and Towne 1978). The valley tribes were decimated by a malaria epidemic in 1833, which did not spread to the hill tribes. However, Captain John Sutter settled in Hill Nisenan territory in 1839 and the subsequent discovery of gold resulted in the widespread killing and persecution of the Nisenan located in the region. By 1860, disease, violence, forced relocation, and environmental destruction had greatly affected valley populations and traditional systems (Moratto 1984).

Historic Setting

Early European travelers through the region included Gabriel Moraga and a group of Spanish explorers in 1806–1808, and fur trappers and explorers in the 1820s. Jedediah Smith led a group of trappers along the edge of the foothills to the American River in search of a pass over the Sierra Nevada in 1826. Kit Carson and John C. Fremont crossed the mountains near Lake Tahoe and descended along the South Fork of the American River in 1844, eventually arriving at Sutter's Fort in Sacramento.

The SPA was located immediately north of *Rancho Omochumnes*, a rancho run by partners Jared Sheldon and William Daylor. Sheldon and Daylor profited by selling cattle and supplies to mines and miners who were making their way along Jackson Road, which was then the main route to and from Sacramento to the Cosumnes River diggings. Conflicts arose when miners began working streams within the rancho, ignoring the owners' property rights. Sheldon was killed in a confrontation with miners in 1850 (Peak & Associates 1997). However, other than any minor amounts of gold recovered by these illicit operations, little mineral wealth has been recovered in the SPA. The vast dredging areas to the north and west offer visual evidence of the location of gold mining activities that lasted into the 1960s. Some of those tailings areas have since been demolished for McDonnell-Douglas test facilities north of the SPA, where various facilities were used for assembly and testing of rocket systems through 1969 (Peak & Associates 2005). The SunCreek property has been used principally for cattle ranching and dry farming.

In 1918 the U.S. Air Force constructed Mills Field (later renamed Mather Field) located immediately west of the SPA. Mather Air Force Base was built to serve as a flight training school. After World War II, the base was the only aerial navigation school remaining for the U.S. military and its allies. A Strategic Air Command B-52 squadron was assigned to the air force base in 1958, a position it kept until 1989, when the base was decommissioned under the federal Base Realignment and Closure Act. The closure of the base prompted the Sacramento County Board of Supervisors to examine the potential for converting the base to a public use airport facility. The air force transferred the base to the County of Sacramento, and in May 1995 Mather Airport was opened. Other parts of the old base were redeveloped for use as housing and a business park (California State Military Museum 2007).

ARCHAEOLOGICAL RESOURCES

Peak & Associates (1997) sent a letter of inquiry to the Native American Heritage Commission (NAHC) in 1997 asking for information or concerns regarding the SPA. The NAHC's reply included a list of individuals and organizations that might have information or concerns regarding the project. Peak & Associates attempted to contact people on the list; the only response received was a verbal response from Joe Marine, who had no knowledge of specific sites or activities within the SPA. In May 2007, EDAW (now AECOM) sent out a new contact letter to the NAHC, with a map of the SPA and a request for information (Appendix O). On May 31, 2007, Ms. Debbie Pilas-Treadway of the NAHC responded; her response indicated that no sites were found in the Sacred Lands file that coincided with the SunCreek project location. Ms. Pilas-Treadway did provide EDAW (now AECOM) with a list of individuals and organizations that might have knowledge of cultural resources in the SPA. EDAW (now AECOM) sent contact letters to these individuals and organizations that contained information regarding the project and a request to provide any information or concerns that they might have. No response from these individuals or organizations was received.

Records Search Results

A records search was conducted at the North Central Information Center (NCIC) of the California Historical Resources Information System, located at California State University, Sacramento. The NCIC records search included examination of the following resources:

- State Office of Historic Preservation's Historic Property Directory and Determination of Eligibility (2006)
- National and California Registers of Historic Places (2006)
- *Historic Resources Inventory*
- *California State Historical Landmarks* (1996 and updates)
- *California Points of Historical Interest* (1992 and updates)
- Historic maps:
  - 1849 Sacramento Valley
  - 1856 General Land Office Plat Township 8 North/Range 7 East
  - 1887-88 USGS Sacramento Sheet
  - 1908 USGS Buffalo Creek
  - 1954 U.S. Army Corps of Engineers Buffalo Creek Sheet 1761 11SW

The NCIC reported that several cultural resources inventories have been conducted at least partially within the SPA (Table 3.5-1). Additional surveys have been conducted within one mile of the SPA (Table 3.5-1), but only two cultural resources—both historic-era depressions in the ground—have been identified (Table 3.5-2). The remains of a homestead were identified near the eastern edge of the SPA (Table 3.5-2). In addition, tailings from post–World War II dredger mining are prominent on the landscape to the north and west of, but not within, the SPA. The historic locations identified in Table 3.5-2 have been examined for their historic and scientific significance and integrity; none were found to include qualities that would make them eligible for listing in the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR).

Table 3.5-1 Cultural Resources Studies			
NCIC Report #	**Author**	**Title**	**Date**
Studies Conducted within the SPA			
1724	Peak & Associates, Inc.	*Cultural Resources Assessment of the Sunrise Douglas Specific Plan and Community Plan Area, Sacramento County, California*	1997
2383	Peak & Associates, Inc.	*Cultural Resources Assessment of the Sunrise Douglas Specific Plan and Community Plan Area, Sacramento County, California*	1997
2383 Update	Peak & Associates, Inc.	*Determination of Eligibility and Effect for the SunCreek Residential Development Project, Sacramento County, California*	2005
5848	Peak & Associates, Inc.	*Determination of Eligibility and Effect for the Arista del Sol Project Area, Sacramento County, California*	2004
Studies Conducted within One Mile of the SPA			
185	Kenneth J. McIvers	*An Archeological Survey of Mather Air Force Base, Sacramento County, California*	1985
1715	Peak & Associates, Inc.	*Cultural Resources Assessment of the Sunrise-Douglas Property, Sacramento County, California*	1989
2691	Garcia and Associates	*Cultural Resources Inventory Report for the County of Sacramento, Kiefer Landfill Bufferlands Acquisition 93-PWE-0158*	2001
5846	ECORP Consulting	*Cultural Resources Inventory and Evaluation Sunridge Ranch, Sacramento County, California*	2004
5847	Peak & Associates, Inc.	*Determination of Eligibility and Effect for the Anatolia IV Project Area, Sacramento County, California*	2004
5849	Peak & Associates, Inc.	*Determination of Eligibility and Effect for the Sunrise Douglas Road Improvements Two Project Area, Sacramento County, California*	2005
5850	Peak & Associates, Inc.	*Determination of Eligibility and Effect for the Sunridge Park Project Area, Sacramento County, California*	2004
5855	Peak & Associates, Inc.	*Determination of Eligibility and Effect for the Grantline 208 Project Area, Sacramento County, California*	2005
Note: NCIC = North Central Information Center Source: Data provided by the North Central Information Center, California State University, Sacramento, in 2007			

Table 3.5-2 Cultural Resources within and near the SunCreek Project Site				
Site #	**Site Type**	**Resource Description**	**Date Recorded**	**Location**
P-34-532	Historic	Well depression	1999	Within SPA
P-34-533	Historic	Cellar depression	1999	Within SPA
CA-SAC-308H	Historic	Dredge tailings	1989	Near SPA
CA-SAC-507H	Historic	Remains of homestead structures	2000	Near SPA
Source: Data provided by the North Central Information Center, California State University, Sacramento, in 2007				

The records searches listed above were performed in 2007. New records searches have not been obtained since that time because the specific plan would be developed on privately owned land, and the project applicants have not undertaken any further cultural studies on their properties.

Field Survey Results

The *Cultural Resources Assessment of the Sunrise Douglas Specific Plan and Community Plan Area, Sacramento County, California* (Peak & Associates 1997) documented the only survey effort that included the entire SPA. The author reported that survey conditions at the time of the fieldwork were good, with good ground surface visibility. The archaeologists in that effort did not identify any prehistoric resources. They did note two historic resources. The first was a depression in the ground which they speculated could be a well either at a residence that has disappeared or at a cattle barn. The depression measured 5 meters in diameter and dropped steeply to a depth of about 1.5 meters. The 1916 USGS quadrangle map of the area shows a structure at this location. There were no artifacts seen at the site.

The second resource is a larger depression that serves as a water hole for cattle. The original source of the depression may be the cellar of the William Carroll residence, which was noted on the 1916 quadrangle map. The depression was full of water at the time of the survey, so archaeologists could not determine a depth; the surface area is irregular, measuring approximately 14.5 by 8 meters across. The area has been trampled by cattle, so the outlines of the depression have been altered. No artifacts were noted at the site other than barbed wire. Oak and willow trees were established on the northwest and south sides of the water hole.

3.5.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to take into consideration the potential effects of proposed undertakings on cultural resources listed on or determined potentially eligible for inclusion in the NRHP, and to allow the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on the proposed undertaking. The regulations implementing Section 106 are promulgated by the Secretary of the Interior, as codified in Code of Federal Regulations (CFR) Title 36, Part 800 (36 CFR Part 800).

The SPA is not located on Federal land and the Proposed Project Alternative would not be Federally funded, but the project does require a Federal action authorizing a permit under Section 404 of the Clean Water Act; therefore, compliance with the requirements of Section 106 is required. Section 106 requirements apply to properties that are not formally determined eligible for the NRHP, but that are considered by the State Historic Preservation Office to meet eligibility requirements. The intensity of impacts on archaeological resources relates to the importance of the information the resources may contain and/or the extent of disturbance or degradation.

The process of determining the NRHP eligibility of a site or district is guided by the specific legal context of the site's significance as set out in 36 CFR Part 60.4 (see below). The NHPA authorizes the Secretary of the Interior to maintain and expand a National Register of districts, sites, buildings, structures, and objects of significance in American history, architecture, archaeology, engineering, and culture. A property may be eligible for listing in the NRHP if it meets criteria for evaluation as defined in 36 CFR 60.4, as follows:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

(a) that are associated with events that have made a significant contribution to the broad patterns of our history;

(b) that are associated with the lives of persons significant in our past;

(c) that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) that have yielded, or may be likely to yield, information important in prehistory or history.

If a cultural resource is identified that appears to be eligible for listing in the NRHP, then 36 CFR 800.6 ("Resolution of Adverse Effects") states that consulting parties to an undertaking may use standard treatments established under Section 800.14(d) as a basis for a Memorandum of Agreement (MOA) to deal with known "historic properties" or a Programmatic Agreement (PA) to deal with as-yet undiscovered "historic properties." Thus, under NEPA, an executed MOA or PA may include provisions to avoid impacts, limit the magnitude of the undertaking, rehabilitate historic properties, preserve properties in place, relocate historic properties, or document or recover data to mitigate the effects of an undertaking to a less-than-significant level.

A map of the Area of Potential Effects (APE) also is required, as described in Section 106 and codified in 36 CFR 800.4(a)(1). The project boundary, as depicted in Exhibit 2-2 of this DEIR/DEIS, has been used as the project APE.

American Indian Religious Freedom Act of 1978 (Public Law 95-341)

The American Indian Religious Freedom Act established Federal policy to protect and preserve the inherent rights of freedom for Native American groups to believe, express, and exercise their traditional religions. These rights include, but are not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

National Register of Historic Places

The NRHP was authorized by the National Historic Preservation Act of 1966 and is administered by the National Park Service. The NRHP is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

The NRHP program includes review of nominations submitted by states, tribes, and other Federal agencies and list eligible properties in the National Register; guidance on evaluating, documenting, and listing different types of historic places through the National Register Bulletin series and other publications; and help for qualified historic properties to receive preservation benefits and incentives.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Environmental Quality Act

CEQA offers directives regarding impacts on historical resources and unique archaeological resources. The State CEQA Guidelines define a "historical resource" to include more than one category of resources. The first category is "resource(s) listed or eligible for listing on the CRHR." (California Code of Regulations [CCR] Section 15064.5[a][1]; see also California Public Resources Code Sections 5024.1 and 21084.1.) A historical resource may be eligible for inclusion in the CRHR, as determined by the State Historical Resources Commission or the lead agency, if the resource:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- is associated with the lives of persons important in our past;
- embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- has yielded, or may be likely to yield, information important in prehistory or history.

In addition, a resource is presumed to constitute a "historical resource" if it is included in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant." (CCR Section 15064.5[a][2].)

Another category of "historical resources" is those deemed significant pursuant to criteria set forth in Public Resources Code Section 5024.1(g), as follows:

> [a] resource identified as significant in an historical survey may be listed in the California Register if the survey meets all of the following criteria:
>
> (1) The survey has been or will be included in the State Historic Resources Inventory.
>
> (2) The survey and the survey documentation were prepared in accordance with . . . procedures and requirements [of the State Office of Historic Preservation].
>
> (3) The resource is evaluated and determined by the [State Office of Historic Preservation] to have a significance rating of Category 1 to 5 on [the California State Parks Historic Resources Inventory Form].
>
> (4) If the survey is five years or more old at the time of its nomination for inclusion in the California Register, the survey is updated to identify historic resources which have become eligible or ineligible due to changed circumstances or further documentation and those which have been demolished or altered in a manner that substantially diminishes the significance of the resource.

Resources identified by such surveys are presumed to be historically or culturally significant unless the preponderance of the evidence demonstrates otherwise.

The final category of "historical resources" is an optional one, which a lead agency may opt to consider or not consider. According to the State CEQA Guidelines (CCR Section 15064.5[a][3]):

> Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

In addition to the obligation to consider impacts on "historical resources," CEQA and the State CEQA Guidelines require consideration of unique archaeological sites (California Public Resources Code Section 21083.2, 14 CCR Section 15064.5). A "unique archaeological resource" is defined in CEQA (Public Resources Code Section 21083.2[g]) as:

> …an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
>
> (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
>
> (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
>
> (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If data recovery through excavation is the only feasible mitigation, a data recovery plan that makes provisions for adequately recovering the scientifically consequential information from and about the historical resource shall be prepared and adopted before any excavation is undertaken (CCR Section 15126.4[b][3][C]). Other acceptable methods of mitigation under the State CEQA Guidelines (CCR Section 15126.4) include excavation and curation or study in place without excavation and curation (if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource).

The State CEQA Guidelines (CCR Section 15064.5[e]) require that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the NAHC must be contacted within 24 hours. At that time, the State CEQA Guidelines (CCR Section 15064.5[d]) direct the lead agency to consult in a timely manner with any appropriate Native Americans as identified by the NAHC, and direct the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Native American Heritage Commission

The California NAHC is the state's "trustee agency" for the protection and preservation of Native American cultural resources, sacred sites on public land, and Native American burial sites. The NAHC facilitates consultation between California tribal governments, Indian organizations, and tribal elders with local, state, and Federal agencies.

California Register of Historical Resources

The State Historical Resources Commission designed this program for use by state and local agencies, private groups, and citizens to identify, evaluate, register, and protect California's historical resources. The CRHR program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance, identifies historical resources for state and local planning purposes, determines eligibility for state historic preservation grant funding, and affords certain protections under CEQA.

Regional and Local Plans, Policies, Regulations, and Ordinances

City of Rancho Cordova General Plan

Goals and policies from the *City of Rancho Cordova General Plan* (City General Plan 2003) relating to cultural resources that are applicable to the Proposed Project and other alternatives under consideration are listed in Appendix K.

3.5.3 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Cultural Resources

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or other alternatives under consideration were determined to result in a significant impact related to cultural resources if they would do any of the following:

- cause a substantial adverse change in the significance of a unique archaeological resource or a historical resource as defined in Section 21083.2 of CEQA and Section 15064.5 of the State CEQA Guidelines, respectively; or
- disturb any human remains, including those interred outside of formal cemeteries.

The State CEQA Guidelines (CCR Section 15064.5) define "substantial adverse change" as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings.

Under the NHPA, if it is determined that historic properties may be affected by an undertaking, the agency proceeds with the Section 106 process, assessing adverse effects. The criteria of adverse effects are found in Section 800.5(a)(1) of the regulations of the NHPA. According to the criteria, an adverse effect occurs when the integrity of the historic property may be diminished by the undertaking through alteration of the characteristics that qualify the property for the NRHP. Such alteration can be a direct result or an indirect consequence of the undertaking. The criteria of adverse effect state:

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Adverse effects on historic properties include, but are not limited to:

- physical destruction of or damage to all or part of the property;
- alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with *The Secretary of Interior's Standards for the Treatment of Historic Properties* (36 CFR Part 68) and applicable guidelines;
- removal of the property from its historic location;
- change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;

- neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
- transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

ANALYSIS METHODOLOGY

The analysis of cultural resources presented herein is based on a background record search and research in the Sacramento Archives and Museum Collection Center conducted by Peak & Associates in 1997, field studies of the area conducted by various sources from 1985 to 2005, a Native American contact program, and examination of archaeological survey, inventory, and evaluation reports prepared by various consultants in the last two decades.

The impacts and mitigation measures below are generally discussed using CEQA language such as "significant impacts" rather than "adverse effects." This discussion includes consideration of resources under the NHPA as well as CEQA, but without offering the confusion of using two sets of similar terminology. As a reminder, cultural resources may be historic or prehistoric. The word "historic" may be a temporal reference, or it may signify the importance of a resource from either the historic or prehistoric era; a historic resource, as defined by CEQA, is a site that is eligible or potentially eligible for listing in the CRHR. The reader must follow the context of the discussion to understand which use of the word is being made.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE Permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.5-1 **Loss of or Damage to Known Cultural Resources Sites.** *Construction activities during project implementation could result in the loss of known cultural resources.*

NP

Under the No Project Alternative, the SPA would be undeveloped. There would be no project-related ground-disturbing activities and no demolition of known cultural resources, and thus **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, PP, BIM, CS, ID

Development of the SPA would include grading activity over an approximately 1,000-acre area. Known cultural resources consist of the well and cellar depressions noted in Table 3.5-2. As described in the *Determination of Eligibility and Effect for the SunCreek Specific Plan Area* (Peak and Associates 2008), Appendix P, these two resources do not appear to meet significance criteria for the NRHP under the NHPA or for the CRHR under CEQA for the following reasons:

- The sites are not associated with important people or events in history (NRHP criteria a and b).
- Through history, the SPA was occupied sporadically by families attempting to earn a living from the land through agricultural pursuits; however, the land has a thin soil mantle and is therefore marginal for

agricultural use, suitable only for cultivation of hay, or for seasonal grazing of cattle, sheep, and horses. There is no distinctive design or plan to the two resources (NRHP criterion c).

- There are no associated artifacts or deposits that could be used to answer important research questions or provide more information about the history of the sites (NRHP criterion d).

Although USACE has not yet reached a formal eligibility determination at this time, for purposes of this DEIR/DEIS, and based on the evaluation performed in the *Determination of Eligibility and Effect for the SunCreek Specific Plan Area* (Peak and Associates 2008) as referenced above, it appears that the sites are not eligible or potentially eligible for the NRHP or CRHR, and thus no management of the resources is required. Therefore, destruction of these resources would have **no direct** or **indirect** impact. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.5-2	**Potential Damage to As-Yet-Undiscovered Cultural Resources Sites.** *Construction and other earthmoving activities during project implementation could result in damage to as-yet-undiscovered cultural resources.*

NP

Under the No Project Alternative, the SPA would be undeveloped. There would be no project-related ground-disturbing activities and no demolition of undiscovered prehistoric cultural resources, and thus **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, PP, BIM, CS, ID

Development of the SPA would include grading activity over an approximately 1,000-acre area. No prehistoric resources or potentially significant historic-era resources were identified in any of the previous survey efforts. However, as-yet-undiscovered resources might be found during project construction. If any of these sites were eligible or potentially eligible for listing on the NRHP or CRHR, **direct** impacts to these as-yet-undiscovered resources would be **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.5-2: Reduce Potential Impacts on Cultural Resources through Preconstruction Worker Education and Consultation if Resources are Encountered.

Before the start of construction activities, construction worker training shall be presented to all construction personnel involved in earth work, including the site superintendent. This training shall include a presentation and flyer describing the types of resources and the procedures to be followed should resources be encountered. If traces of prehistoric occupation (e.g., midden soils, unusual amounts of shell, artifacts, bone) or historic-era remains (e.g., building or structure traces, concentrations of early-historic-era refuse) are encountered, the City of Rancho Cordova shall be notified and ground-disturbing activities within 50 feet of the find shall cease until a qualified professional archaeologist can determine the nature and potential significance of the find and recommend a treatment plan. As suggested by CEQA Guidelines Section 15126.4(b)(3)(A), preservation in place is the preferred method of mitigation for archaeological sites (i.e., avoidance through construction rerouting or revisions). If this is not feasible, a data recovery plan shall be prepared that could include, but is not necessarily limited to, additional archival research and subsurface excavations for archaeological testing and/or data recovery (using techniques outlined in State CEQA Guidelines Sections 15126.4[b], 15064.5, or measures outlined in 36 CFR 800.6). The data recovery plan shall include provisions for adequately recovering the scientifically consequential information from and about the historical resource, and it shall be prepared, submitted to the City for approval, and implemented prior to any excavation being undertaken. The project applicants of all project phases shall be required to implement all recommendations made by the professional archaeologist, as deemed necessary and feasible by the City. Construction work in the vicinity of the find shall not resume until the treatment plan is completed.

Implementation: Project applicants for any particular discretionary development application.

Timing: Before and during all ground-disturbing activities.

Enforcement: City of Rancho Cordova Community Development Department.

The likelihood of encountering as-yet undiscovered resources in the SPA is low; however that possibility always remains. If such a resource were encountered, and it appeared to be eligible for listing on the NRHP or CRHR, then project impacts would be mitigated under Mitigation Measure 3.5-2, using techniques outlined in State CEQA Guidelines CCR Section 15126.4(b) (e.g., preservation, data recovery, recordation) or measures outlined in 36 CFR 800.6. These measures are specifically designed to reduce the impact of a project and therefore would reduce the impact of construction-related activities at the SPA on undiscovered/unrecorded historic cultural resources to a **less-than-significant** level under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives.

IMPACT 3.5-3 **Potential Damage to Human Remains.** *Construction and other earthmoving activities during project implementation could result in damage to as-yet-undiscovered human burials.*

NP

Under the No Project Alternative, the SPA would be undeveloped. There would be no project-related ground-disturbing activities and no demolition of burials, and thus **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, PP, BIM, CS, ID

Although no evidence of prehistoric or early historic interments was found at the SPA in surface contexts, unmarked and undocumented subsurface human remains could still be present at the site. Because of the possibility that project-related construction activities at the SPA may affect as-yet-undiscovered or unrecorded human remains, this **direct** impact is considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.5-3: Provide Preconstruction Worker Education and Stop Potentially Damaging Work if Human Remains are Uncovered During Construction.

In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, the contractor and/or the project applicants of all project phases shall immediately halt potentially damaging excavation in the area of the burial and shall notify the Sacramento County Coroner and a professional archaeologist to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (California Health and Safety Code Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, he or she must contact the NAHC by phone within 24 hours of making that determination (California Health and Safety Code Section 7050[c]). Following the coroner's findings, the property owner, contractor, or project applicants of all project phases, an archaeologist, and the NAHC-designated Most Likely Descendant (MLD) shall determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains are identified in California Public Resources Code (PRC) Section 5097.9.

Upon the discovery of Native American remains, the landowner shall ensure that the immediate vicinity (according to generally accepted cultural or archaeological standards and practices) is not damaged or disturbed by further development activity until consultation with the MLD has taken place. The MLD shall have 48 hours to complete a site inspection and make recommendations after being granted access to the site. A range of possible treatments for the remains, including nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. California PRC Section 5097.9 suggests that the concerned parties may extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. The following is a list of site protection measures that the landowner shall employ:

(1) Record the site with the NAHC or the appropriate Information Center.
(2) Use an open-space or conservation zoning designation or easement.
(3) Record a document with the county in which the property is located.

The landowner or landowner's authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance if the NAHC is unable to identify a MLD, or if the MLD fails to make a recommendation within 48 hours after being granted access to the site. The landowner or authorized representative may also reinter the remains in a location not subject to further disturbance if he or she rejects the recommendation of the MLD and mediation by the NAHC fails to provide measures acceptable to the landowner. The project applicants of all project phases shall implement mitigation for the protection of the burial remains. Construction work in the vicinity of the burials shall not resume until the mitigation is completed.

Implementation:	Project applicants for any particular discretionary development application.
Timing:	Before the approval of grading plans and during all ground-disturbing activities for all project phases.
Enforcement:	City of Rancho Cordova Planning Department.

The likelihood of encountering human remains in the SPA is low; however that possibility always remains. If remains were encountered, then implementation of Mitigation Measure 3.5-3 would require the procedures in the California Health and Safety Code outlined above to be followed. These procedures are specifically designed to reduce the impact of project implementation related to human remains and therefore this impact would be reduced to a **less-than-significant** level under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives.

3.5.4 Residual Significant Impacts

Impacts related to known cultural resources are less than significant. With implementation of Mitigation Measures 3.5-2 and 3.5-3 listed above, potential impacts to previously undiscovered cultural resources and human remains, if any are encountered at the SPA, would be reduced to a less-than-significant level. Therefore, project implementation would not result in any residual significant impacts related to cultural resources.

3.5.5 Cumulative Impacts

Cultural resources in the project region (City of Rancho Cordova, eastern Sacramento County) generally consist of prehistoric sites, isolated artifacts, mining features, and structures from rocket testing facilities. During the 19th and 20th centuries, intensive mining in the region likely resulted in the destruction or disturbance of prehistoric sites, as well as earlier, smaller-scale mining sites. Since this period, the creation and enforcement of various regulations protecting cultural resources have substantially reduced the rate and intensity of these impacts;

however, even with these regulations, cultural resources are still degraded or destroyed as development in the region proceeds.

The results of the cultural resources records searches and inventories conducted for the Proposed Project Alternative indicate that the SPA contains two separate historic depressions, one for a well and the other for a cellar. These features, however, were found to be not eligible for listing in the NHRP or CRHR, and removal of these features was found to not substantially alter the interpretation of prehistoric or historic activities in the region.

The SunCreek Specific Plan project would not contribute to any cumulatively incremental considerable impacts on known resources because surveys conducted for the SPA did not conclude that the SPA or vicinity is highly sensitive for archaeological resources and there have been no such discoveries of sensitive resources in the SPA and vicinity. Although undiscovered cultural resources may underlie the SPA, Mitigation Measures 3.5-2 and 3.5-3 would reduce the project's impacts on as-yet-undiscovered site-specific cultural resources to a less-than-significant level. It is unknown whether the related project sites contain historic resources, or whether the related projects would implement appropriate mitigation to reduce impacts on any resources that might be present. Furthermore, even after mitigation is implemented at the related projects, it may be impossible to avoid the historic resource, and a substantial adverse change in the significance of the historical resource (such as damaging or destroying the qualities that make it significant) could result. Therefore, the related projects could result in significant impacts in and of themselves. However, because all of the project-specific impacts would be less than significant, project implementation would not result in a cumulatively considerable incremental contribution to significant cumulative impact on historic resources.

3.6 ENVIRONMENTAL JUSTICE

3.6.1 AFFECTED ENVIRONMENT

Environmental justice is defined by the U.S. Environmental Protection Agency (EPA) Office of Environmental Justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Fair treatment means that "no group of people, including racial, ethnic, or socioeconomic group shall bear a disproportionate share of negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies."

For the purposes of an environmental justice screening, race, ethnic origin, and poverty status were obtained for all of the City of Rancho Cordova (City); part of the City of Sacramento; and all or part of the unincorporated communities of Carmichael, Fair Oaks, Gold River, La Riviera, Rosemont, Arden-Arcade, and North Highlands. These city and unincorporated community boundaries represent a 6-mile radius surrounding the SPA, which is the area that is appropriate for consideration pursuant to EPA guidelines.

The present-day City of Rancho Cordova began as a part of a route used during the Gold Rush by miners departing Sacramento and heading toward the Sierra Nevada foothills in 1848. By the late 19th and the early 20th centuries, agriculture had become the main industry in the region. In 1918, the U.S. Air Force constructed Mills Field, later renamed Mather Field. Mather Air Force Base (AFB) was built to serve as a flight training school. A Strategic Air Command B-52 squadron was assigned to Mather AFB in 1958 and operated until 1989, when the base was decommissioned under the Base Realignment and Closure Act (California Military Museum 2007). The closure of the base prompted the County of Sacramento (County) Board of Supervisors to examine the potential for converting the base to a public-use facility. The Air Force transferred the base to the County, and in May 1995 Mather Airport was opened. Other parts of the base were redeveloped for use as housing and a business park.

The name "Rancho Cordova" was formally applied to the area currently known as the City of Rancho Cordova in 1955 when a post office was established. Efforts by local residents to formally establish a city continued over the next 40 years, until Rancho Cordova was incorporated by voter approval in July 2003. When the city incorporated in 2003, it included more than 55,000 residents.

Existing land use patterns in Rancho Cordova have developed from regional growth patterns, geography, and circulation. The City's vision includes a community that will support a mix of land uses, including public spaces, services, culture, and open space and recreation, in addition to well-planned roadways, public transportation routes, and trails. An integrated network of neighborhoods, villages, and districts will serve as building blocks for the community's growth and revitalization (City of Rancho Cordova 2006). City planners hope to create a community with an identifiable look and feel, where the quality of the built environment is reflected in the character of the neighborhoods, the walkable streets, the unified architectural details and landscaping, and the dynamics of the public spaces.

3.6.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Executive Order 12898

The purpose of Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low Income Populations" (1994), is to identify and address the disproportionate placement of adverse environmental, economic, social, or health impacts from Federal actions and policies on minority and/or low-income communities. This order requires that planners take into account impacts on minority or low-income populations when they prepare environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by Federal agencies.

Executive Order 12898, signed by President Clinton on February 11, 1994, requires the following:

- To the greatest extent practicable and permitted by law…each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. (Section 1-101)

- Each Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin. (Section 2-2)

- Each Federal agency shall work to ensure that public documents, notices, and hearings relating to human health or the environment are concise, understandable, and readily accessible to the public. (Section 5-5[c])

In addition, the presidential memorandum accompanying the executive order states that "(e)ach Federal Agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA [National Environmental Policy Act] of 1969."

Two documents provide some measure of guidance to agencies required to implement the executive order. The first is *Environmental Justice Guidance Under the National Environmental Policy Act*, published by the Council on Environmental Quality (CEQ) (1997). The second document, *Final Guidance for Incorporating Environmental Justice Concerns* (published in EPA's NEPA Compliance Analysis) (61 Federal Register [FR] 135, July 12, 1996), serves as a guide for incorporating environmental justice goals into preparation of environmental impact statements under NEPA. These documents provide specific guidelines for determining whether there are any environmental justice issues associated with a proposed Federal project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

There are no state plans, policies, regulations, or laws related to environmental justice that are applicable to the Proposed Project or alternatives under consideration. However, Senate Bill (SB) 115 (Solis, Chapter 690, Statutes of 1999) was signed into law in 1999, defined environmental justice in statute, and established the Governor's Office of Planning and Research (OPR) as the coordinating agency for state environmental justice programs (Section 65040.12). SB 115 further required the California Environmental Protection Agency (CalEPA) to develop a model environmental justice mission statement for boards, departments, and offices within the agency by January 1, 2001 (California Public Resources Code Sections 72000–72001).

In 2000, SB 89 (Escutia, Chapter 728, Statutes of 2000) was signed, which complemented SB 115 by requiring the creation of an environmental justice working group and an advisory group to assist CalEPA in developing an intra-agency environmental justice strategy (California Public Resources Code Sections 72002–72003). SB 828 (Alarcón, Chapter 765, Statutes of 2001) added and modified due dates for the development of CalEPA's intra-agency environmental justice strategy and required each board, department, and office within CalEPA to identify and address, no later than January 1, 2004, any gaps in its existing programs, policies, and activities that may impede environmental justice (California Public Resources Code Sections 71114–71115).

Assembly Bill (AB) 1553 (Keeley, Chapter 762, Statutes of 2001) required OPR to incorporate environmental justice considerations in the *State of California General Plan Guidelines 2003*. AB 1553 specified that the guidelines should propose methods for local governments to address the following:

- planning for the equitable distribution of new public facilities and services that increase and enhance community quality of life,

- providing for the location of industrial facilities and uses that pose a significant hazard to human health and safety in a manner that seeks to avoid overconcentrating these uses in proximity to schools or residential dwellings,

- providing for the location of new schools and residential dwellings in a manner that avoids proximity to industrial facilities and uses that pose a significant hazard to human health and safety, and

- promoting more livable communities by expanding opportunities for transit-oriented development.

Although environmental justice is not a mandatory topic in the general plan, OPR is required to provide guidance to cities and counties for integrating environmental justice into their general plans (Section 65040.12[c]) (OPR 2003). The 2003 edition of the general plan guidelines included the contents required by AB 1553 (see pages 8, 12, 20–27, 40, 114, 142, 144, and 260 of the revised guidelines).

Regional and Local Plans, Policies, Regulations, and Ordinances

There are no regional or local plans, policies, regulations, or ordinances related to environmental justice that are applicable to the Proposed Project or alternatives under consideration.

3.6.3 Environmental Consequences and Mitigation Measures

Thresholds of Significance

To prove a violation of Federal environmental justice principles, the government must demonstrate that the proposed project or alternatives under consideration would cause impacts that are "disproportionately high and adverse," either directly, indirectly, or cumulatively. To make a finding that disproportionately high and adverse effects likely would fall on a minority or low-income population, three conditions must be met simultaneously:

(1) there must be a minority or low-income population in the impact zone;
(2) a high and adverse impact must exist; and
(3) the impact must be disproportionately high and adverse on the minority or low-income population.

Analysis Methodology

According to CEQ and EPA guidelines established to assist Federal and state agencies for developing strategies to examine this circumstance, the first step in conducting an environmental justice analysis is to define minority and low-income populations. Based on these guidelines, a minority population is present in a project study area if (1) the minority population of the affected area exceeds 50%, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. By the same rule, a low-income population exists if the project study area comprises 50% or more people living below the poverty threshold, as defined by the U.S. Census Bureau, or is substantially greater than the poverty percentage of the general population or other appropriate unit of geographic analysis.

The second step of an environmental justice analysis requires a finding of a "high and adverse" impact. The CEQ guidance indicates that when determining whether the effects are high and adverse, agencies are to consider whether the risks or rates of impact "are significant (as employed by NEPA) or above generally accepted norms."

The final step requires a finding that the impact on the minority or low-income population be “disproportionately high and adverse.” Although none of the published guidelines define the term “disproportionately high and adverse,” CEQ includes a nonquantitative definition stating that an effect is disproportionate if it appreciably exceeds the risk or rate to the general population.

As defined in EPA’s *Final Guidance for Incorporating Environmental Justice Concerns* (61 FR 135, July 12, 1996), for the purposes of an environmental justice screening, the study area is an approximately 6-mile radius surrounding the SPA. To use a comparable distance in this analysis, data from the U.S. Census Bureau, 2000 Census, for race, ethnic origin, and poverty status were obtained. All census tracts touching on the 6-mile radius were included in the analysis.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE Permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.6-1	**Potential Effects on Low-Income Populations.** *Project implementation would not create a disproportionate placement of adverse environmental impacts on low-income populations.*

NP

No development would occur under the No Project Alternative that could have a potential impact on a low-income population; thus, **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

According to the year 2000 census tracts (Table 3.6-1), there is one tract out of a total of 33 with a poverty population greater than 50% within 6 miles of the SPA. Of the 33 census tracts, 10 have poverty populations greater than 10%. Two have poverty populations between 20 and 30% of the tract population. Tract 8800 has the highest poverty rate, with 85.8% of the population below the poverty level in the year 2000. The boundary of Tract 8800 corresponds to Mather Field (formerly Mather AFB) and abuts the western boundary of the SPA’s census tract (Tract 8701). Since the closure of the base in 1995, this area has undergone substantial redevelopment, including construction of 1,300 new homes from 1999 to 2004, modernization and improvement of streets and infrastructure, commercial development, and the continued use of Mather Airport for general aviation and air cargo. Data from Mather Field indicate that by the year 2000, approximately 2,600 new jobs had been generated by redevelopment activities, and economic development is expected to continue. Poverty rates for Tract 8800 are expected to improve substantially from redevelopment activities. In addition, implementation of the project would not disproportionately affect or directly influence Tract 8800 because of its distance from the SPA. Therefore, project implementation would not cause a disproportionately high and adverse impact on low-income populations. This would be a **less-than-significant, direct** impact. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

Table 3.6-1 Poverty Statistics within 6 Miles of the SPA			
Census Tract Code	**Total Population**	**Below Poverty Level[1]**	**Poverty Rate**
005804	2,659	115	4.3
007702	4,566	337	7.4
007802	4,815	614	12.8
008005	5,199	177	3.4
008006	5,540	178	3.2
008009	4,293	366	8.5
008010	4,766	412	8.6
008503	8,045	246	3.1
008504	4,236	48	1.1
008600	5,307	200	3.8
008701	5,123	31	0.6
008702	3,355	46	1.4
008800	520	446	85.8
008905	4,816	797	16.5
008907	5,198	694	13.4
008908	4,976	799	16.1
008909	2,146	389	18.1
008910	3,521	280	8.0
008911	2,287	677	29.6
008912	3,347	247	7.4
008913	4,534	732	16.1
009005	3,226	328	10.2
009006	4,638	584	12.6
009007	2,443	718	29.4
009009	3,886	394	10.1
009103	2,821	478	16.9
009107	3,253	156	4.8
009108	3,666	170	4.6
009109	5,082	394	7.8
009112	3,592	344	9.6
009200	1,432	74	5.2
009315	5,513	194	3.5
009404	4,913	102	2.1

[1] Figures are for individuals for whom poverty status has been determined.

Source: U.S. Census Bureau 2000a

IMPACT 3.6-2 **Potential Effects on Minority Populations.** *Project implementation would not create a disproportionate placement of adverse environmental impacts on minority communities.*

NP

No development would occur under the No Project Alternative that could have a potential impact on a minority population; thus, **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

Analyzing the data in aggregate across the census tracts (Table 3.6-2), the minority population in the project study area is less than 50%. The Caucasian population is approximately 71.7%. Minority (non-Caucasian) populations comprise 28.3% of the combined populations of the 2000 census tract data. Therefore, project implementation would not cause a disproportionately high and adverse impact on minority populations. This would be a **less-than-significant**, **direct** impact. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

3.6.4 RESIDUAL SIGNIFICANT IMPACTS

All impacts associated with environmental justice are considered less than significant. Therefore, no residual significant impacts exist.

3.6.5 CUMULATIVE IMPACTS

Past, present, and probable future projects used for this cumulative analysis are restricted to those projects that have occurred or are planned to occur within a 6-mile radius of the SPA. Within this radius, Tract 8800 has the highest poverty rate, with 85.8% of the population below the poverty level in the year 2000. The boundary of Tract 8800 corresponds to Mather Field (formerly Mather AFB). Since the closure of the base in 1988 and the opening of Mather Airport in 1995, this area has undergone substantial redevelopment, including construction of 1,300 new homes from 1999 to 2004, modernization and improvement of streets and infrastructure, commercial development, and the continued use of Mather Airport for general aviation and air cargo. Data from Mather Field indicate that by the year 2000, approximately 2,600 new jobs had been generated by redevelopment activities, and economic development is expected to continue. Poverty rates for Tract 8800 are expected to decrease substantially as a result of new development and redevelopment activities with implementation of the *Mather Airport Master Plan* (Sacramento County 2003). Currently, the draft final master plan is being reviewed by the County Department of Environmental Review and Assessment pursuant to the California Environmental Quality Act. The goal of the master plan is to guide development over the next 20 years and to identify the facilities necessary to meet near- and long-term aviation demand. The project and related projects are not anticipated to disproportionately impact low-income and minority populations or communities; therefore, no cumulatively considerable incremental impacts would result.

Table 3.6-2
Race Statistics within 6 Miles of the SPA

Census Tract Code	Caucasian	Black	American Indian or Alaskan Native	Asian	Hawaiian or Pacific Islander	Hispanic Origin	Other Race	Two or More Races	Census Tract Total
005804	2,282	16	13	196	1	78	1	72	2,659
007702	3,908	87	15	185	17	228	13	118	4,571
007802	4,230	165	39	114	8	324	4	132	5,016
008005	4,328	81	34	320	2	300	3	139	5,207
008006	4,724	86	21	310	18	291	17	109	5,576
008009	3,715	51	30	117	4	292	10	119	4,338
008010	4,033	88	37	178	3	304	15	154	4,812
008503	6,042	140	28	1,015	19	551	6	244	8,045
008504	3,040	67	8	665	7	257	6	127	4,177
008600	4,550	134	35	160	3	396	4	130	5,412
008701	3,527	73	18	769	8	209	11	100	4,715
008702	2,746	25	4	445	4	125	2	69	3,420
008800	373	118	17	62	20	139	8	177	914
008905	3,214	408	47	349	13	730	6	236	5,003
008907	3,614	398	26	386	13	541	22	235	5,235
008908	3,552	398	36	230	7	593	20	150	4,986
008909	1,409	191	12	224	6	225	8	193	2,164
008910	2,465	260	38	156	16	441	12	184	3,581
008911	1,213	393	17	103	18	418	1	146	2,309
008912	2,374	258	13	230	9	352	11	117	3,364
008913	3,460	295	32	202	6	372	5	432	4,534
009005	1,834	414	18	341	8	481	10	152	3,258
009006	2,522	691	37	519	17	564	10	300	4,660
009007	1,105	563	10	186	47	459	8	174	2,552
009009	1,995	408	38	706	40	518	8	190	3,903
009103	1,915	404	8	299	7	425	8	169	3,235
009107	2,280	230	7	306	9	352	12	136	3,332
009108	2,348	256	34	454	12	435	8	137	3,684
009109	3,400	404	18	474	11	553	4	232	5,096
009112	1,986	357	38	455	19	518	6	194	3,573
009200	869	27	35	219	0	223	2	72	1,447
009315	4,030	163	40	530	17	634	4	207	5,625
009404	3,912	101	63	117	4	513	18	192	4,920
Total	**96,995**	**7,480**	**866**	**11,022**	**375**	**12,571**	**279**	**5,538**	**135,323**
Percent	**71.7**	**5.5**	**0.6**	**8.1**	**0.3**	**9.3**	**0.2**	**4.1**	**–**

Source: U.S. Census Bureau 2000b

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3.7 GEOLOGY, SOILS, MINERALS, AND PALEONTOLOGICAL RESOURCES

3.7.1 AFFECTED ENVIRONMENT

GEOLOGY

Regional Geology

The SPA is located within the northern portion of the Sacramento Valley, which, together with the San Joaquin Valley, comprises the Great Valley geomorphic province. The Great Valley is a forearc basin composed of thousands of feet of sedimentary deposits that has undergone periods of subsidence and uplift over millions of years. The Great Valley basin began to form during the Jurassic period as the Pacific oceanic plate was subducted underneath the adjacent North American continental plate. In the western portion of the Great Valley, Upper Jurassic to Upper Cretaceous rock sequences rest on Upper Jurassic oceanic crust sequences. In contrast, the eastern portion of the Great Valley is composed of shallow Pleistocene nonmarine deposits over a layer of Cretaceous marine/deltaic deposits only a few hundred feet thick, which rests on the metamorphic and igneous rocks of the Sierra Nevada—the western edge of the continental margin.

During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. Geologic evidence suggests that the Sacramento Valley and San Joaquin Valley gradually separated into two separate water bodies as uplift and sedimentation continued. By the time of the Miocene epoch (approximately 24 million years ago), sediments deposited in the Sacramento Valley were mostly of terrestrial origin. In contrast, the San Joaquin Valley continued to be inundated with water for another 20 million years, as indicated by marine sediments dated to the late Pliocene (approximately 5 million years ago).

Most of the surface of the Great Valley is covered with Holocene and Pleistocene-age alluvium. This alluvium is composed of sediments from the Sierra Nevada to the east and the Coast Range to the west, which were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits.

Local Geology

The SPA is located along the eastern edge of the Sacramento Valley, adjacent to the Sierra Nevada foothills. According to the U.S. Geological Survey (USGS) Buffalo Creek 7.5-Minute Quadrangle map, the topography is relatively flat over the entire site, gently sloping downward in a westerly direction. Elevations at the SPA range from 120 to 240 feet above mean sea level.

The SPA is underlain by the Laguna Formation, which is of Pliocene age (approximately 5 million years Before Present [B.P.]) (Wagner et al. 1987). The Laguna Formation is composed of a mixture of sedimentary deposits of silt, clay, and sand interbedded with cobbles of the ancestral American River channel. This formation probably extends downward at a 45-degree angle south of the American River, in essence forming a wedge above the underlying volcanic rocks, which thins toward the Sierra Nevada and thickens toward the axis of the valley. The average depth of the Laguna Formation in the eastern portion of the valley is probably less than 500 feet. Volcanic materials forming the basement rocks approximately 250 feet thick have been reported beneath the Laguna Formation south of Folsom in wells drilled for gold-dredging operations (Olmsted and Davis 1961).

REGIONAL SEISMICITY AND FAULT ZONES

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is fault ground rupture, also called surface faulting. Common secondary seismic hazards include ground shaking, liquefaction, and subsidence. Each of these potential hazards is discussed below.

Fault Ground Rupture

Surface rupture is an actual cracking or breaking of the ground along a fault during an earthquake. Structures built over a fault can be torn apart if the ground ruptures. Surface ground rupture along faults is generally limited to a linear zone a few yards wide. The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (see Section 3.7.3, "Regulatory Framework," below) was created to prohibit the location of structures designed for human occupancy across the traces of active faults, thereby reducing the loss of life and property from an earthquake. The SPA is not located in an Alquist-Priolo Earthquake Fault Zone (California Geological Survey [CGS] 2007, Hart and Bryant 1999). The nearest fault zoned under the Alquist-Priolo Act is the northern segment of the Cleveland Hills Fault, located near Lake Oroville, approximately 50 miles north of the SPA. Research conducted by the California Department of Water Resources (DWR) indicates that the magnitude 5.7 earthquake that occurred on August 1, 1975 along the Cleveland Hills Fault mostly likely resulted from reservoir-induced stress (DWR 1989).

Seismic Ground Shaking

Ground shaking, motion that occurs as a result of energy released during faulting, could potentially result in the damage or collapse of buildings and other structures, depending on the magnitude of the earthquake, the location of the epicenter, and the character and duration of the ground motion. Other important factors to be considered are the characteristics of the underlying soil and rock and, where structures exist, the building materials used and the workmanship of the structures.

Faults in the Project Region

The West Branch of the Bear Mountains fault, within the Foothills fault system, is located approximately 5 miles east of the eastern property boundary; however, Jennings (1994) does not indicate that fault activity has occurred within the last 11,000 years, and the slip rate of the Foothills fault system is extremely low (0.05 millimeters per year), which is well below the planning threshold for major earthquakes (USGS 2000). With the exception of the Dunnigan Hills fault, located in the Woodland area, the Sacramento Valley has generally not been seismically active in the last 11,000 years (Holocene time). Faults with known or estimated activity during the Holocene are generally located in the San Francisco Bay Area to the west, or in the Lake Tahoe area to the east, as shown in Table 3.7-1. In addition, Table 3.7-1 identifies the faults' approximate distance from the SPA, fault type, and maximum moment magnitude.

The intensity of ground shaking depends on the distance from the earthquake epicenter to the site, the magnitude of the earthquake, site soil conditions, and the characteristics of the source. Ground motions from seismic activity can be estimated by probabilistic method at specified hazard levels and by site-specific design calculations using a computer model. The CGS Probabilistic Seismic Hazards Assessment Model indicates a minimum horizontal acceleration of 0.112*g* for soft rock and 0.15*g* for alluvial conditions (where *g* is the percentage of gravity) at the SPA with a 10% probability of earthquake occurrence in a 50-year timeframe for use in earthquake-resistant design (CGS 2010). Stated another way, these calculations indicated there is a 1-in-10 probability that an earthquake will occur within 50 years that would result in a peak horizontal ground acceleration exceeding 0.112 or 0.115*g*.

The current 2010 California Building Standards Code (CBC) specifies more stringent design guidelines where a project would be located adjacent to a Class A or B fault as designated by the California Probabilistic Seismic Hazard Maps. The A and B fault classifications are also used by CGS and USGS in characterizing the level of certainty associated with determining seismologic parameters. As shown in Table 3.7-1, the SPA is located approximately 60 miles from the nearest Class A or B fault.

Table 3.7-1 Faults with Evidence of Activity During Holocene Time in the Project Region					
Fault Name	**Approximate Distance from SPA (miles)**	**Regional Location**	**Maximum Moment Magnitude[1]**	**Slip Rate (mm/yr)**	**Fault Type[2]**
Dunnigan Hills	40	Western Sacramento Valley	6.5	N/A	NA
Cleveland Hills/Swain Ravine	50	Sierra Nevada Foothills	6.5	0.05	NA
Great Valley Fault Zone Segment 4	60	Margin between Sacramento Valley and Coast Range	6.6	1.5	B
Great Valley Fault Zone Segment 5	65	Margin between Sacramento Valley and Coast Range	6.5	1.5	B
Green Valley	65	Coast Range	6.2	5.0	B
Greenville Fault Zone (includes Clayton and Marsh Creek sections)	65	Coast Range	6.6	2.0	B
Concord	70	Coast Range	6.2	4.0	B
West Tahoe/Dollar Point Fault Zone	60	Lake Tahoe	7.2	N/A	NA
North Tahoe/Incline Village Fault Zone	60	Lake Tahoe	7.0	0.2 – 1.0	B

Notes: NA = not available or not known; mm/yr = millimeters per year

[1] The moment magnitude scale is used by seismologists to compare the energy released by earthquakes. Unlike other magnitude scales, it does not saturate at the upper end, meaning that there is no particular value beyond which all earthquakes have about the same magnitude, which makes this scale a particularly valuable tool for assessing large earthquakes.

[2] Faults with an “A” classification are capable of producing large magnitude (M) events (M greater than 7.0), have a high rate of seismic activity (e.g., slip rates greater than 5 millimeters per year), and have well-constrained paleoseismic data (e.g., evidence of displacement within the last 700,000 years). Class “B” faults are those that lack paleoseismic data necessary to constrain the recurrence intervals of large-scale events. Faults with a “B” classification are capable of producing an event of M 6.5 or greater.

Sources: Cao 2003, Jennings 1994, Mualchin 1996, Ichinose et al. 1999, Sawyer 1999, Sawyer and Haller 2000; data compiled by AECOM in 2011

Seismic Seiches/Tsunamis/Mudflows

Earthquakes may affect open bodies of water by creating seismic sea waves and seiches. Seismic sea waves (often called “tidal waves” or “tsunamis”) are caused by abrupt ground movements (usually vertical) on the ocean floor in connection with a major earthquake. A seiche is a sloshing of water in an enclosed or restricted water body, such as a basin, river, or lake, which is caused by earthquake motion; the sloshing can occur for a few minutes or several hours. Although an 1868 earthquake along the Hayward fault in the San Francisco Bay Area is known to have generated a seiche along the Sacramento River, the affected area was located in the Sacramento–San Joaquin River Delta (Delta). A mudflow is downhill movement of soft, wet, unconsolidated earth and debris, made fluid by rain or melted snow and often building up great speed.

Because of the long distance of the SPA from the Pacific Ocean and the Delta, and lack of enclosed water bodies at the SPA, seiches and tsunamis would not represent a hazard for project implementation. Because the SPA is located on level terrain, mudflows would not represent a hazard for project implementation.

Ground Failure/Liquefaction

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid, thus becoming similar to quicksand. Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits, along with recent Holocene-age deposits, are more susceptible to liquefaction, while older deposits of clayey silts, silty clays, and clays deposited in freshwater environments are generally stable under the influence of seismic ground shaking.

Liquefaction poses a hazard to engineered structures. The loss of soil strength can result in bearing capacity insufficient to support foundation loads, increased lateral pressure on retaining or basement walls, and slope instability.

Based on a review of geologic maps and Natural Resources Conservation Service (NRCS) soil data, it is unlikely that soils on the SPA would be subject to liquefaction in the event of an earthquake because the SPA is underlain by relatively stable Pleistocene-age soils, the potential seismic sources are a relatively long distance away, and the groundwater table is at least 100 feet below the ground surface.

Subsidence, Settlement, and Soil Bearing Capacity

Subsidence of the land surface can be induced by both natural and human phenomena. Natural phenomena that can cause subsidence can result from tectonic deformations and seismically induced settlements; from consolidation, hydrocompaction, or rapid sedimentation; from oxidation or dewatering of organic-rich soils; and from subsurface cavities. Subsidence related to human activity can result from withdrawal of subsurface fluids or sediment. Pumping of water for residential, commercial, and agricultural uses from subsurface water tables causes more than 80% of the identified subsidence in the United States (Galloway et al. 1999). Lateral spreading is the horizontal movement or spreading of soil toward an open face, such as a streambank, the open side of fill embankments, or the sides of levees. The potential for failure from subsidence and lateral spreading is highest in areas where the groundwater table is high, where relatively soft and recent alluvial deposits exist, and where creek banks are relatively high. Soil bearing capacity is the ability of soil to support the loads applied to the ground; where the bearing capacity is too low to support proposed structures, subsidence and settlement may occur.

The SPA contains creek banks, and areas of low soil bearing strength (see Table 3.7-2); however, since a geotechnical investigation has not been performed for the SPA, it is not possible to determine with certainty whether or not any areas of unstable soils are present at the SPA that would represent a construction and/or development hazard.

Slope Stability

A landslide is the downhill movement of masses of earth material under the force of gravity. The factors contributing to landslide potential are steep slopes, unstable terrain, and proximity to earthquake faults. This process typically involves the surface soil and an upper portion of the underlying bedrock. Movement may be very rapid, or so slow that a change of position can be noted only over a period of weeks or years (creep). The size of a landslide can range from several square feet to several square miles.

The topography at the SPA and the surrounding vicinity is relatively flat, therefore landslides are not expected to represent a hazard.

Naturally Occurring Asbestos

Asbestos is a term applied to several types of naturally occurring fibrous materials found in rock formations in various locations throughout California. Exposure and disturbance of rock and soil that contains asbestos can result in the release of fibers to the air and consequent exposure to the public. All types of asbestos are now considered hazardous and pose public health risks. Naturally occurring asbestos is commonly found in ultramafic rock, including serpentine. The SPA is underlain by the Laguna Formation, which does not contain ultramafic rock. Thus, naturally occurring asbestos is not present at the SPA.

Table 3.7-2
Soil Characteristics

Soil Map Unit Name	Shrink-Swell Potential[1]	Permeability[2]	Water Erosion Hazard[3]	Wind Erosion Hazard[4]	Drainage	Concrete Corrosivity	Steel Corrosivity	Limitations for Buildings and Roads
Corning complex, 0-8% slopes	Moderate	Moderately high	Low	4	Well drained	High	High	Slopes from 4-8%; shrink-swell potential
Corning-Redding complex, 8-30% slopes	Moderate	Moderately high	Low	4	Well drained	High	High	Slopes greater than 15%; shrink-swell potential
Fiddyment fine sandy loam, 1-8% slopes	Low	Moderately high	Moderate	3	Well drained	Moderate	High	Shrink-swell potential; low soil strength
Hedge loam, 0-2% slopes	Low	Moderately high	Moderate	5	Moderately well drained	Low	High	Occasional flooding; soil saturation at depth less than 18 inches
Hicksville loam, 0-2% slopes, occasionally flooded	Moderate	Moderately high	Moderate	5	Moderately well drained	Low	Moderate	Shrink-swell potential; occasional flooding; soil saturation at depth less than 18 inches
Hicksville gravelly loam, 0-2% slopes, occasionally flooded	Moderate	Moderately high	Low	6	Moderately well drained	Low	Moderate	Shrink-swell potential; occasional flooding; soil saturation at depth less than 18 inches; low soil strength
Madera loam, 2-8% slopes	Moderate	Moderately high	Moderate	5	Moderately well drained	Low	High	Shrink-swell potential; low soil strength
Peters clay, 1-8% slopes	High	Moderately high	Moderate	5	Well drained	Low	Moderate	Shrink-swell potential; soft bedrock at depth less than 20 inches; low soil strength
Red Bluff-Redding complex, 0-5% slopes	Moderate	Moderately high	Moderate	5	Well drained	High	High	Shrink-swell potential
Redding loam, 2-8% slopes	Moderate	Moderately high	Moderate	5	Moderately well drained	Moderate	High	Shrink-swell potential
Redding gravelly loam, 0-8% slopes	Moderate	Moderately high	Moderate	6	Moderately well drained	Moderate	High	Shrink-swell potential
San Joaquin silt loam, 0-3% slopes	Low	Moderately high	Moderate	5	Moderately well drained	Moderate	Moderate	None
San Joaquin silt loam, 3-8% slopes	Low	Moderately high	Moderate	5	Moderately well drained	Moderate	Moderate	None

Notes:
1 Based on percentage of linear extensibility. Shrink-swell potential ratings of "moderate" to "very high" can result in damage to buildings, roads, and other structures.
2 Based on standard U.S. Department of Agriculture (USDA) saturated hydraulic conductivity (Ksat) class limits; Ksat refers to the ease with which pores in a saturated soil transmit water.
3 Based on the USDA erosion factor "Kw whole soil," which is a measurement of relative soil susceptibility to sheet and rill erosion by water.
4 Based on the USDA wind erodibility group. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.
Source: NRCS 2009

Soil Resources

Exhibit 3.7-1 shows the locations of the soil types present on the SPA and Table 3.7-2 summarizes the relevant soil characteristics.

Mineral Resources

Under the Surface Mining and Reclamation Act (SMARA), the State Mining and Geology Board may designate certain mineral deposits as being regionally significant to satisfy future needs. The Board's decision to designate an area is based on a classification report prepared by CGS and on input from agencies and the public. The SPA lies within the designated Sacramento-Fairfield Production-Consumption Region for Portland cement concrete aggregate, which includes all designated lands within the marketing area of the active aggregate operations supplying the Sacramento-Fairfield urban center.

In compliance with SMARA, the California Division of Mines and Geology (CDMG) has established the classification system shown in Table 3.7-3 to denote both the location and significance of key extractive resources.

Table 3.7-3
California Division of Mines and Geology Mineral Land Classification System

Classification	Description
MRZ-1	Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence
MRZ-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists
MRZ-3	Areas containing mineral deposits, the significance of which cannot be evaluated from existing data
MRZ-4	Areas where available data are inadequate for placement in any other mineral resource zone

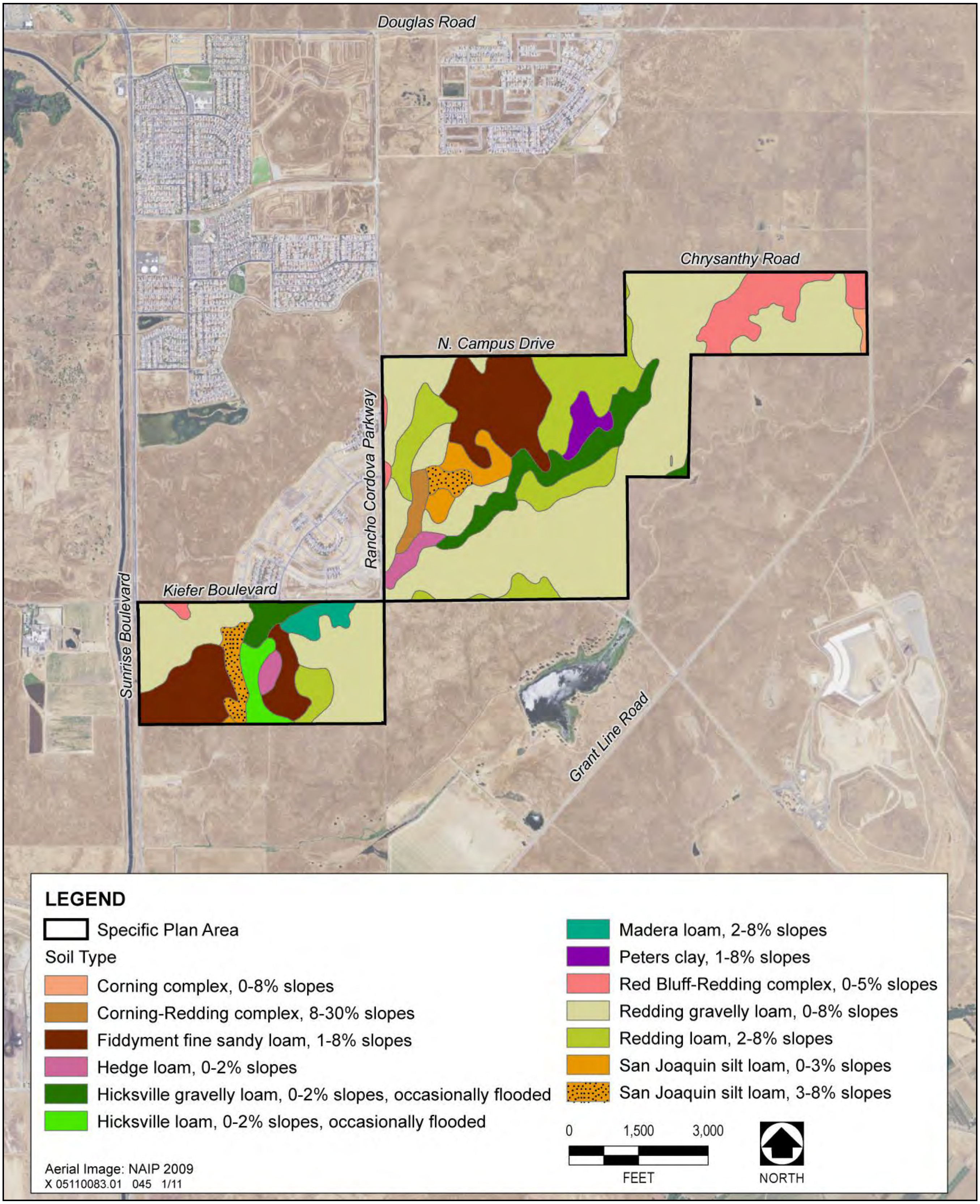
Note: MRZ = Mineral Resource Zone
Source: Dupras 1988

The SPA is classified as MRZ-3 for Portland Cement-grade aggregate—an area where the significance of mineral deposits cannot be evaluated from existing data (Dupras 1988, 1999). Lloyd (1984) indicates that the SPA is classified as either MRZ-3 or MRZ-4 for Placer gold, copper, zinc, and industrial minerals (i.e., carbonate rock, clay, sand, lignite, talc, asbestos). The SPA is zoned MRZ-1 (no known deposits) of chromite.

According to the City of Rancho Cordova General Plan (2006), and the Sacramento County General Plan Update (2009), the SPA is not listed as a locally-important mineral resource recovery site.

Paleontological Resources

Geologic maps prepared by Wagner et al. (1987) and Bartow and Helley (1979) indicate that the SPA is underlain by the Pliocene-age (approximately 5 million years B.P.) Laguna Formation. A search of published literature indicates only one reference to a Pliocene-age vertebrate fossil specimen from the Laguna Formation in Northern California: Stirton (1939) refers to a Pliocene-age fossil specimen of a horse tooth found in clayey silt, probably of the Laguna Formation although not definitely identified as such, in a well near the town of Galt, in Sacramento County. Results of a paleontological records search at the University of California Museum of Paleontology (2009) indicate no recorded fossil sites within a 5-mile radius of the SPA. Therefore, sediments at the SPA are considered to be of low paleontological sensitivity.



Source: SSURGO 2007

Soil Types in the SPA **Exhibit 3.7-1**

3.7.2 Regulatory Framework

Federal Plans, Policies, Regulations, and Laws

Earthquake Hazards Reduction Act

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act to reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. To accomplish this goal, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

The mission of NEHRP includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The NEHRPA designates the Federal Emergency Management Agency as the lead agency of the program and assigns several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and USGS.

State Plans, Policies, Regulations, and Laws

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Act (California Public Resources Code [PRC] Sections 2621–2630) was passed in 1972 to mitigate the hazard of surface faulting to structures designed for human occupancy. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones known as Earthquake Fault Zones around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning efforts. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (California PRC Sections 2690–2699.6) addresses earthquake hazards from nonsurface fault rupture, including liquefaction and seismically induced landslides. The act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The act also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

National Pollutant Discharge Elimination System Permit

In California, the State Water Resources Control Board (SWRCB) administers regulations promulgated by the U.S. Environmental Protection Agency (55 Code of Federal Regulations [CFR] 47990) requiring the permitting of stormwater-generated pollution under the National Pollutant Discharge Elimination System (NPDES). In turn, the SWRCB’s jurisdiction is administered through nine regional water quality control boards. Under these Federal regulations, an operator must obtain a general permit through the NPDES Stormwater Program for all construction activities with ground disturbance of 1 acre or more. The general permit requires the implementation of best management practices (BMPs) to reduce sedimentation into surface waters and to control erosion. One element of compliance with the NPDES permit is preparation of a storm water pollution prevention plan (SWPPP) that addresses control of water pollution, including sediment, in runoff during construction. (See Section 3.9, “Hydrology and Water Quality,” for more information about the NPDES and SWPPPs.)

California Building Standards Code

The California Building Standards Commission is responsible for coordinating, managing, adopting, and approving building codes in California. The State of California provides minimum standards for building design through the 2010 CBC (CCR, Title 24). Where no other building codes apply, Chapter 29 of the 2010 CBC regulates excavation, foundations, and retaining walls. The CBC applies to building design and construction in the state and is based on the Federal Uniform Building Code (UBC) used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The CBC has been modified for California conditions with numerous more detailed or more stringent regulations.

The state earthquake protection law (California Health and Safety Code Section 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. The 2010 CBC requires an evaluation of seismic design that falls into Categories A through F (where F requires the most earthquake-resistant design) for structures designed for a project site. The CBC philosophy focuses on “collapse prevention,” meaning that structures are designed for prevention of collapse for the maximum level of ground shaking that could reasonably be expected to occur at a site. Chapter 16 of the CBC specifies exactly how each seismic design category is to be determined on a site-specific basis through the site-specific soil characteristics and proximity to potential seismic hazards.

Chapter 18 of the CBC regulates the excavation of foundations and retaining walls. This chapter regulates the preparation of a preliminary soil report, engineering geologic report, geotechnical report, and supplemental ground-response report. Chapter 18 also regulates analysis of expansive soils and the determination of the depth to groundwater table. For Seismic Design Category C, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading. For Seismic Design Categories D, E, and F, Chapter 18 requires these same analyses plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also requires addressing mitigation measures to be considered in structural design. Mitigation measures may include ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions. Peak ground acceleration must be determined from a site-specific study, the contents of which are specified in CBC Chapter 18.

Finally, Appendix J of the 2010 CBC regulates grading activities, including drainage and erosion control and construction on unstable soils, such as expansive soils and areas subject to liquefaction.

California Surface Mining and Reclamation Act

SMARA (California PRC Section 2710 et seq.) was enacted by the California Legislature in 1975 to regulate activities related to mineral resource extraction. The act requires the prevention of adverse environmental effects caused by mining, the reclamation of mined lands for alternative land uses, and the elimination of hazards to public health and safety from the effects of mining activities. At the same time, SMARA encourages both the conservation and the production of extractive mineral resources, requiring the State Geologist to identify and attach levels of significance to the state’s varied extractive resource deposits. Under SMARA, the mining industry in California must plan adequately for the reclamation of mined sites for beneficial uses and provide financial assurances to guarantee that the approved reclamation will actually be implemented. The requirements of SMARA must be implemented by the local lead agency with permitting responsibility for the proposed mining project.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Rancho Cordova General Plan

Goals and policies from the *City of Rancho Cordova General Plan* (City General Plan 2006) relating to geology and soils that are applicable to the Proposed Project and alternatives under consideration are listed in Appendix K.

Sacramento County Zoning Code Title II, Article 4, Surface Mining

The County has adopted its own SMARA ordinance, which is modeled after the state's SMARA guidelines (see above). The County's SMARA ordinance is designed to protect mineral resources from incompatible land uses, to manage the mineral resources, to assure the County of an adequate supply of these resources with due consideration for the environment, and to provide for the restoration of mined lands for future use. A Conditional Use Permit is required for surface-mining operations in Sacramento County.

City of Rancho Cordova/Sacramento County Grading Ordinance

The Sacramento County Land Grading and Erosion Control Ordinance (County Code, Title 16, Chapter 16.44), adopted by the City of Rancho Cordova in 2003, was enacted for the purpose of minimizing damage to surrounding properties and public rights-of-way; limiting degradation of the water quality of watercourses; and curbing the disruption of drainage system flow caused by the activities of clearing, grubbing, grading, filing, and excavating land. The ordinance includes administrative procedures, minimum standards of review, and implementation and enforcement procedures for the control of erosion and sedimentation that are directly related to land-grading activities.

3.7.3 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Geology, Soils, and Minerals

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or alternatives under consideration were determined to result in a significant impact related to geology, soils, or mineral resources if they would do any of the following:

- expose people, property, or structures to potential substantial adverse impacts, including the risk of loss, injury, or death involving:
  - rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
  - strong seismic ground shaking;
  - seismic-related ground failure, including liquefaction; or
  - landslides.
- result in substantial soil erosion or the loss of topsoil;

- be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;

- be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property;

- have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water;

- result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan; or

- result in inundation by seiche, tsunami, or mudflow.

Paleontological Resources

Based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. a project would have a significant impact on paleontological resources if it would directly or indirectly destroy a unique paleontological resource or site. For the purposes of this EIR/EIS, this threshold also encompasses the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts and applies to the Proposed Project and alternatives under consideration. A "unique paleontological resource or site" is one that is considered significant under the professional paleontological standards described below.

An individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved, and it meets one of the following criteria:

- a type specimen (i.e., the individual from which a species or subspecies has been described);

- a member of a rare species;

- a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn;

- a skeletal element different from, or a specimen more complete than, those now available for its species; or

- a complete specimen (i.e., all or substantially all of the entire skeleton is present).

The value or importance of different fossil groups varies depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions (such as for a research project). Marine invertebrates are generally common; the fossil record is well developed and well documented, and they would generally not be considered a unique paleontological resource. Identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare.

ANALYSIS METHODOLOGY

The analysis prepared for this EIR/EIS relied on published geologic literature and maps, and NRCS soil survey data ("Web Soil Survey"). The information obtained from these sources was reviewed and summarized to present the existing conditions and to identify potential environmental impacts, based on the thresholds of significance presented in this section. Impacts associated with geology, soils, and mineral resources that could result from project construction and operational activities were evaluated qualitatively based on site conditions; expected construction practices; materials, locations, and duration of project construction and related activities; and a field visit. A conceptual grading exhibit for the SPA (MacKay & Somps 2010) was also used to evaluate potential impacts.

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, the Society of Vertebrate Paleontology (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas that have not had any previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity until surveys and mapping are performed to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly subsurface testing, a qualified paleontologist can determine whether the area should be categorized as having high or low sensitivity. In keeping with the significance criteria of the Society of Vertebrate Paleontology (1995), all vertebrate fossils are generally categorized as being of potentially significant scientific value.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR/EIS

Risks to People or Structures Caused by Surface Fault Rupture—The SPA is located approximately 50 miles from the nearest Alquist-Priolo Earthquake Fault Zone, and the SPA is not underlain by or adjacent to any known faults. Because the damage from surface fault rupture is generally limited to a linear zone a few yards wide, the potential for surface fault rupture to cause damage to proposed structures is negligible and this impact is not evaluated further in this EIR/EIS.

Soil Suitability for Use with Septic Systems—Sewer service at the SPA would be provided via connection with regional facilities and treatment by Sacramento Regional County Sanitation District. Since project soils would not be used for septic systems or alternative means of waste disposal, there would be no impact, and this issue is not evaluated further in this EIR/EIS.

Inundation by Seiche, Tsunami, or Mudflow—Because of the long distance of the SPA from the Pacific Ocean and the Delta, and the lack of enclosed water bodies at the SPA, seiches would not represent a hazard at the SPA. Because the SPA is located on level terrain, mudflows would also not represent a hazard. Therefore, this issue is not evaluated further in this EIR/EIS.

Damage or Destruction of Unique Paleontological Resources—The SPA is underlain by the Laguna Formation, which, as described above, is not a paleontonlogically sensitive rock formation. Therefore, there would be no impact related to damage or destruction of unique paleontological resources, and this issue is not evaluated further in this EIR/EIS.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.7-1 **Possible Risks to People and Structures Caused by Strong Seismic Ground Shaking.** *The SPA is located in an area of generally low seismic activity; however, infrastructure on the SPA could be subject to seismic ground shaking from an earthquake along active faults in Lake Tahoe.*

NP

Because no project-related development would occur, there would be no project-related risks to new people or structures from strong seismic ground shaking. Therefore, **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

The SPA is not located within a known fault zone, or within any faults known to be active during Holocene time. The West Branch of the Bear Mountains Fault is located approximately 6 miles east of the eastern property boundary (Jennings 1994); however, Jennings (1994) does not indicate that fault activity has occurred within the last 11,000 years, and the slip rate of the Foothills fault system is extremely low (0.05 millimeters per year), which is well below the planning threshold for major earthquakes (USGS 2000). As shown in Table 3.7-1, the Dunnigan Hills fault in Woodland, approximately 40 miles west of the SPA, is the nearest fault that is known to have been active within the last 11,000 years (Holocene time). Other faults that have been zoned as “active” by the CGS are located in the Coast Range (approximately 60 miles west of the SPA) or in the vicinity of Lake Tahoe (approximately 60 miles east of the SPA). Because infrastructure at the SPA could be subject to seismic ground shaking and because geotechnical reports have not been prepared for the entire SPA, the potential for damage from strong seismic ground shaking is considered a **direct, potentially significant** impact. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.7-1a: Prepare Site-Specific Geotechnical Report per CBC Requirements and Implement Appropriate Recommendations.

Before building permits are issued and construction activities begin any project development phase, the project applicants for any particular discretionary development application shall hire a licensed geotechnical engineer to prepare a final geotechnical subsurface investigation report, which shall be submitted for review and approval to the City of Rancho Cordova Planning Department. The final geotechnical engineering report shall address and make recommendations on the following:

- site preparation;
- soil bearing capacity;
- appropriate sources and types of fill;
- potential need for soil amendments;
- road, pavement, and parking areas;
- structural foundations, including retaining-wall design;
- grading practices;
- soil corrosion of concrete and steel;
- erosion/winterization;
- seismic ground shaking;
- liquefaction; and
- expansive/unstable soils.

In addition to the recommendations for the conditions listed above, the geotechnical investigation shall include subsurface testing of soil and groundwater conditions, and shall determine appropriate foundation designs that are consistent with the version of the CBC that is applicable at the time building and grading permits are applied for. All recommendations contained in the final geotechnical engineering report shall be implemented by the project applicants of each project phase. Special recommendations contained in the geotechnical engineering report shall be noted on the grading plans and implemented as appropriate before construction begins. Design and construction of all new project development shall be in accordance with the CBC. The project applicants shall provide for engineering inspection and certification that earthwork has been performed in conformity with recommendations contained in the geotechnical report.

Mitigation Measure 3.7-1b: Monitor Earthwork during Earthmoving Activities.

All earthwork shall be monitored by a qualified geotechnical or soils engineer retained by the project applicants for any particular discretionary development application. The geotechnical or soils engineer shall provide oversight during all excavation, placement of fill, and disposal of materials removed from and deposited on both on- and off-site construction areas.

Implementation: Project applicants for any particular discretionary development application.

Timing: Before issuance of building permits and ground-disturbing activities.

Enforcement: City of Rancho Cordova Planning Department

Implementation of Mitigation Measures 3.7-1a and 3.7-1b would reduce the potentially significant impact of possible damage to people and structures from strong seismic ground shaking under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level by requiring that the design recommendations of a geotechnical engineer to reduce damage from seismic events be incorporated into buildings, structures, and infrastructure as required by the CBC, and that a geotechnical or soils engineer provide on-site monitoring to ensure that earthwork is being performed as specified in the plans.

IMPACT 3.7-2 **Possible Seismically-Induced Risks to People and Structures Caused by Liquefaction.** *Construction activities would not occur in areas subject to liquefaction; therefore, people and structures would not be at risk from liquefaction.*

NP, NCP, PP, BIM, CS, ID

Based on a review of published geological maps and literature it is unlikely that soils on the SPA would be subject to liquefaction in the event of an earthquake, for the following reasons:

- the SPA is underlain by relatively stable Pleistocene-age alluvial deposits;
- the SPA is underlain by a moderately deep groundwater table that is at least 100 feet below the ground surface; and
- the potential sources of seismic activity are a relatively long distance away (approximately 60 miles).

Therefore, **direct** impacts related to potential damage to structures and possible risks to people from seismically-induced liquefaction under the No Project, No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives are considered **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.7-3 **Temporary and Short-term Construction-Related Erosion.** *Construction activities during project implementation would involve grading and movement of earth in soils subject to temporary and short-term wind and water erosion hazard.*

NP

Under the No Project Alternative, no project-related construction activities would occur. Therefore, there would be **no direct** or **indirect** project-related impacts associated with construction-related erosion**.** ***[Lesser]***

NCP, PP, BIM, CS, ID

Project implementation would involve intensive grading and construction activities for infrastructure and building and road foundations over 800 - 1,000 acres of land. Construction activities would occur in soils that have moderate to high wind and water erosion hazard potential. Conducting these activities would result in the temporary and short-term disturbance of soil and would expose disturbed areas to winter storm events. Rain of sufficient intensity could dislodge soil particles from the soil surface. If the storm is large enough to generate runoff, localized erosion could occur. In addition, soil disturbance during the summer as a result of construction activities could result in soil loss because of wind erosion. Therefore, temporary and short-term **direct** impacts associated with construction-related erosion are **potentially significant.** Temporary and short-term **indirect** impacts from soil erosion, such as sediment transport and potential loss of aquatic habitat, are evaluated in Section 3.9, “Hydrology and Water Quality,” and Section 3.3, “Biological Resources,” respectively. ***[Similar]***

Mitigation Measure 3.7-3: Prepare and Implement a Grading and Erosion Control Plan.

Before grading permits are issued, the project applicants for any particular discretionary development application shall retain a California Registered Civil Engineer to prepare a grading and erosion control plan. The grading and erosion control plan shall be submitted to the City Planning Department before issuance of grading permits for all new development. The plan shall be consistent with the City’s Grading Ordinance and the state’s NPDES permit, and shall include the site-specific grading associated with development for each project phases.

The plans referenced above shall include the location, implementation schedule, and maintenance schedule of all erosion and sediment control measures, a description of measures designed to control dust and stabilize the construction-site road and entrance, and a description of the location and methods of storage and disposal of construction materials. Erosion and sediment control measures could include the use of detention basins, berms, swales, wattles, and silt fencing, and covering or watering of stockpiled soils to reduce wind erosion. Soil stabilization measures could include construction of retaining walls and reseeding with vegetation after construction. Stabilization of construction entrances to minimize trackout (control dust) is commonly achieved by installing filter fabric and crushed rock to a depth of approximately 1 foot. The project applicants shall ensure that the construction contractor is responsible for securing a source of transportation and deposition of excavated materials.

Implementation of Mitigation Measure 3.9-1 (discussed in Section 3.9, “Hydrology and Water Quality”) would also help reduce temporary and short-term erosion-related impacts by requiring preparation and implementation of a Storm Water Pollution Prevention Plan with appropriate Best Management Practices.

Implementation: Project applicants for any particular discretionary development application.

Timing: Before the start of construction activities.

Enforcement: City of Rancho Cordova Planning Department

Implementation of Mitigation Measure 3.7-3 along with Mitigation Measure 3.9-1 (discussed in Section 3.9, “Hydrology and Water Quality”), would reduce potentially significant temporary and short-term construction-related erosion impacts under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level because grading and erosion control plans with specific erosion and sediment control measures such as those suggested above or listed in Mitigation Measure 3.9-1 would be prepared, approved by the City, and implemented.

IMPACT 3.7-4	**Potential Geologic Hazards Related to Construction in Unstable Soils.** *Project elements could be constructed in areas of the SPA that contain unstable soils.*

NP

Under the No Project Alternative, no project-related development would occur. Therefore, there would be **no direct** or **indirect** project-related impacts from construction in unstable soils. ***[Lesser]***

NCP, PP, BIM, CS, ID

The SPA is relatively flat, and therefore hazards related to landslides are not expected. However, without a geotechnical report, it is not possible to determine whether or not pockets of unstable soils, commonly located along streambanks or in areas composed of uncompacted fill dirt, are present at the SPA. Therefore, potential geologic hazards from construction in unstable soils is considered a **direct, potentially significant** impact. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.7-1a and 3.7-1b.

Implementation of Mitigation Measures 3.7-1a and 3.7-1b would reduce potential geologic hazards from construction in unstable soils under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level because a geotechnical engineer report would be prepared that identifies areas of unstable soils (if any are present) and incorporates requirements to remediate unstable soils, and all earthwork would be monitored by a soils or geotechnical engineer to ensure compliance with project plans and specifications.

IMPACT 3.7-5	**Potential Damage to Structures and Infrastructure from Construction in Expansive Soils.** *Portions of the SPA are underlain by soils that have a moderate to high potential for expansion when wet and may result damage to structures.*

NP

Under the No Project Alternative, no project-related development would occur. Therefore, there would be **no direct** or **indirect** project-related impacts from construction in expansive soils. ***[Lesser]***

NCP, PP, BIM, CS, ID

Expansive soils shrink and swell as a result of moisture change. These volume changes can result in damage over time to building foundations, underground utilities, and other subsurface facilities and infrastructure if they are not designed and constructed appropriately to resist the damage associated with changing soil conditions. Volume changes of expansive soils also can result in the consolidation of soft clays following the lowering of the water table or the placement of fill. Placing buildings or constructing infrastructure on or in unstable soils can result in structural failure. Based on a review of NRCS soil survey data as shown in Table 3.7-2, portions of the SPA consist of soils with a moderate to high shrink-swell potential, indicating the soils are expansive. Soil expansion, including volume changes during seasonal fluctuations in moisture content, could adversely affect road surfaces, interior slabs-on-grade, landscaping hardscapes, and underground pipelines. Therefore, this **direct** impact is considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3.7-1a and 3.7-1b.

Implementation of Mitigation Measures 3.7-1a and 3.7-1b would reduce the potentially significant impact of damage to people and structures from construction in expansive soils under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level by requiring that the design recommendations of a geotechnical engineer to reduce damage from expansive soils be incorporated into buildings, structures, and infrastructure as required by the CBC, and that a geotechnical or soils engineer provide on-site monitoring to ensure that earthwork is being performed as specified in the plans.

IMPACT 3.7-6 **Potential Geologic Hazard from Construction in Corrosive Soils.** *Most of the soils within which the project components would be constructed are moderately to highly corrosive of concrete and steel, which could subject project facilities to a shorter useful lifespan.*

NP

Under the No Project Alternative, no project-related development would occur. Therefore, there would be **no direct** or **indirect** project-related impacts from construction in corrosive soils. ***[Lesser]***

NCP, PP, BIM, CS, ID

Soil corrosivity is an electrochemical process that results in corrosion of concrete and/or steel in contact with soil. Excessive corrosion can shorten the usable lifespan of the concrete or steel materials used in construction. As shown in Table 3.7-2, NRCS soil survey data indicates that most of the soil types within which project components would be constructed have a moderate to high corrosion potential of both concrete and steel. Excessive corrosion could shorten the useful lifespan of project facilities. Therefore, this **direct** impact is considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3.7-1a.

Implementation of Mitigation Measure 3.7-1a would reduce the potentially significant impact of damage to infrastructure from construction in corrosive soils under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level by requiring that a licensed geotechnical engineer perform a site-specific corrosivity evaluation, and requiring that the design recommendations of a geotechnical engineer to reduce damage from corrosive soils be incorporated into project-related infrastructure. Examples of the types of recommendations that could be made include, but are not limited to, the use of materials that are less subject to corrosion (for example, PVC pipe instead of steel).

IMPACT 3.7-7 **Potential Loss of Mineral Resources**. *The SPA is located within the Sacramento-Fairfield Production-Consumption Region designated by CDMG, but does not contain known deposits of mineral resources.*

NP, NCP, PP, BIM, CS, ID

The SPA is located within the Sacramento-Fairfield Production-Consumption Region, a mineral resources area designated by CDMG as containing “regionally significant” mineral deposits that may be needed to meet future demand. However, according to the City of Rancho Cordova General Plan (2006) and the Sacramento County General Plan Update (2009), the SPA is not listed as a locally-important mineral resource recovery site. Furthermore, the SPA is classified by CDMG as MRZ-3 (areas where significance cannot be determined) and MRZ-4 (areas where no data is available to determine significance) for construction aggregate, placer gold, copper, zinc, and industrial minerals (i.e., carbonate rock, clay, sand, lignite, talc, asbestos). The SPA is zoned MRZ-1 (no known deposits) for chromite.

Because the SPA does not contain any known deposits of regionally-important mineral resources, and is not designated as a local mineral resource recovery site, this **direct** impact would be **less than significant. No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

3.7.4 RESIDUAL SIGNIFICANT IMPACTS

Impacts related to liquefaction and loss of mineral resources are less than significant. With implementation of Mitigation Measures 3.7-1a, 3.7-1b, and 3.7-3, impacts related to strong seismic ground shaking, construction-related erosion, construction in unstable soils, construction in expansive soils, and construction in corrosive soils, would be reduced to less-than-significant levels. Therefore, no residually significant impacts would occur.

3.7.5 CUMULATIVE IMPACTS

Geology and Soils

The project and all of the related projects are located within the eastern portion of the Sacramento Valley. The geologic formations and soil types vary depending on project location, and therefore are site-specific. The SPA is not underlain by or adjacent to any known faults; however, infrastructure on the SPA could be subject to seismic ground shaking from an earthquake along active faults in Lake Tahoe. In addition, the SPA is underlain by expansive and corrosive soils, is subject to seasonal subsurface water flows from surface infiltration that could adversely affect development (i.e., unstable soils), and could result in erosion. Implementation of Mitigation Measures 3.7-1a, 3.7-1b, and 3.7-3 would reduce these impacts to less-than-significant levels through completion of site-specific geotechnical studies and implementation of construction and design measures developed in response to the studies, in addition to compliance with the CBC.

Implementation of the related projects could expose structures and people to seismic and soils hazards similar to those described above. However, each project considered in this cumulative analysis must individually meet building code requirements as well as the requirements of local policies (i.e., grading and erosion control plans), and therefore no additive effect would result and no cumulatively considerable impact related to seismic or soil hazards would occur. Thus, implementation of the project, when considered with the related projects, would not create additional facilities under increased risk of geologic hazards and would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to geology and soils.

Mineral Resources

The project and the related projects are located within the eastern side Sacramento Valley, south of U.S. 50. According to the CDMG, various locations within this geographic area contain known mineral resources. The western edge of the Arboretum project (south of the SPA), and the Rio del Oro project (north of the SPA) are zoned MRZ-2—areas where known aggregate mineral deposits are located. The SunCreek SPA, however, is zoned MRZ-3 for aggregate minerals, and is not designated as a locally-important mineral resource recovery site.

Implementation of the various related projects and other projects in the region could result in cumulative loss of aggregate mineral resources, unless the site-specific projects that contain known mineral resources agree to mine such resources prior to project development. However, because the SPA does not contain sources of known mineral resources, implementation of the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to loss of mineral resources.

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3.8 HAZARDS AND HAZARDOUS MATERIALS

3.8.1 AFFECTED ENVIRONMENT

For purposes of this section, the term “hazardous materials” refers to both hazardous substances and hazardous wastes. A “hazardous material” is defined as “a substance or material that…is capable of posing an unreasonable risk to health, safety, and property when transported in commerce” (49 Code of Federal Regulations [CFR] Section 171.8). California Health and Safety Code Section 25501 defines a hazardous material as follows:

> “Hazardous material” means any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. “Hazardous materials” include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

“Hazardous wastes” are defined in California Health and Safety Code Section 25141(b) as wastes that:

> because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause, or significantly contribute to an increase in mortality or an increase in serious illness[, or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

HAZARDOUS MATERIALS AND SITES

The SPA is part of the Sunrise Douglas Community Plan and was originally known as the Sunrise Douglas 2 Specific Plan. Wallace Kuhl & Associates, Inc. (WKA) was retained to conduct a Phase I Environmental Site Assessment (ESA) for the Sunrise Douglas 2 Specific Plan in 1998. The purpose of the Phase I ESA was to document recognized environmental conditions (RECs) within the SPA related to current and historical uses of the area, and to evaluate the potential for releases of hazardous materials from on- or off-site sources that could affect environmental conditions at the SPA (WKA 1999).

Preparation of the Phase I ESA was guided by standards published by the American Society for Testing and Materials (ASTM) that were current in 1999. In 2005 these standards were updated to include:

- minimum qualifications for environmental assessors;
- interviews of past and present owners of the assessed property; and
- a visual inspection of the property or specific documentation if an inspection cannot be performed.

Because the standards for ESAs have changed since preparation of the Phase I ESA, and database searches were conducted over a decade before the time of release of this EIR/EIS, some of the information in the Phase I ESA conducted by WKA in 1998 is no longer accurate because various remedial actions have since occurred. While information from the Phase I ESA such as database queries can no longer be used, some issues from the Phase I ESA are still relevant to this analysis, as described below: asbestos, lead-based paint, pesticides, petroleum hydrocarbons, and polychlorinated biphenyls (PCBs). Furthermore, due to the age of the Phase I ESA, AECOM performed a search of several hazardous waste databases to determine the most current status. That information is also presented below.

ENVIRONMENTAL CONTAMINATION WITHIN THE SPA

WKA's review of aerial photographs from 1963 to 1991 indicates that the SPA has been used primarily for agriculture since at least 1963. The predominant land use was grazing and dry land farming. A few structures, identified as "dwellings" on the earlier historic topographic maps of the site have been subsequently removed. Other than a decrease or increase in the numbers of agricultural-related structures (rural residences, barns, livestock pens), the SPA has not changed substantially. No obvious hazardous materials concerns were observed by WKA from review of the historical aerial photography (WKA 1999).

The environmental records search and field reconnaissance identified several RECs located within the SPA. These consisted of (1) several above-ground structures which may contain asbestos and/or lead-based paint; (2) one underground fuel storage tank (UST); (3) numerous pole-mounted electrical transformers, some of which may contain PCBs; and (4) on-site wells and septic systems (WKA 1999).

Miscellaneous debris piles were noted as various locations throughout the SPA. These debris piles consisted of inert domestic debris, minor quantities of paper and plastic trash, and out-of-service vehicles. None of the visible debris appeared to be hazardous materials. Since the Phase I ESA was performed, these debris piles may or may not still be present on the SPA. To be conservative and ensure that the worst-case scenario is analyzed under CEQA and NEPA, their presence is assumed for purposes of this analysis.

AECOM performed a search in September 2010 of the following online databases:

- list of hazardous substances sites from the California Department of Toxic Substances Control (DTSC) EnviroStor database;
- list of leaking underground storage tank sites by County and Fiscal Year from the State Water Resources Control Board (SWRCB) GeoTracker database;
- list of solid waste disposal sites identified by SWRCB with waste constituents above hazardous waste levels outside the waste management unit;
- list of "active" Cease and Desist Order and Cleanup and Abatement Orders; and
- list of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the California Health and Safety Code, identified by DTSC.

There are no hazardous waste sites within the SPA that are listed on any of these databases (California Environmental Protection Agency [CalEPA] 2010). Furthermore, based on database searches conducted by AECOM, the UST listed in the Phase I ESA (WKA 1999) no longer appears as a database record. Therefore, for purposes of this analysis, it is assumed that environmental contamination associated with that UST has been remediated; therefore, it is not discussed further in this EIR/EIS.

Asbestos

Asbestos is designated as a hazardous substance when the fibers have potential to come in contact with air because the fibers are small enough to lodge in lung tissue and cause health problems. The presence of asbestos-containing materials (ACMs) in existing buildings poses an inhalation threat only if the ACMs are in a friable state. If the ACMs are not friable, then there is no inhalation hazard because asbestos fibers remain bound in the material matrix. Emissions of asbestos fiber to the ambient air, which can occur during activities such as renovation or demolition of structures made with ACMs (e.g., insulation), are regulated in accordance with Section 112 of the Federal Clean Air Act (CAA).

A records search of archived permit record databases at the Sacramento County Department of Public Works, Building Inspection Division, Commercial Plan Review Office did not indicate whether building materials containing asbestos were used in the construction of buildings in the SPA. Asbestos may be present in buildings constructed prior to the 1978-79 Federal ban of most friable asbestos-containing building materials (WKA 1999). The SPA is not located in an area containing asbestos-containing rock (i.e., serpentine).

Lead-Based Paint

Human exposure to lead has been determined by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) to be an adverse health risk, particularly to young children. Demolition of structures containing lead-based paint requires specific remediation activities regulated by Federal, state, and local laws. The use of lead as an additive to paint was discontinued in 1978.

Review of historic U.S. Geological Survey (USGS) topographic maps indicates that the five on-site rural residences and four barns were built on or before 1980 and, thus, may contain lead-based paints (WKA 1999).

Pesticides

Rangeland and dry land farming do not typically require the application of persistent pesticides. The Sacramento County Agricultural Commissioner's Office had no Restricted-Use Permits on file for the SPA. These permits are often associated with registered chemical applications to agricultural land (WKA 1999).

Because neither historical nor current land uses within the SPA typically require application of persistent pesticides, and no Restricted-Use Permits were on file with the Sacramento County Agricultural Commissioner's Office, persistent pesticide contamination is unlikely (WKA 1999).

Petroleum Hydrocarbons

Review of the Sacramento County Environmental Management Department (EMD) records identified one farm-exempt fuel UST within the SPA on Assessor's Parcel No. (APN) 067-0100-0015, located at 12435 Kiefer Boulevard. Farm-exempt USTs are not required to register with the County. It is unknown if the farm-exempt fuel UST is present within the SPA. If present, the UST would require removal by the EMD. At the time of the Phase I ESA, the EMD had no record of hazardous materials releases at the SPA. Review of the EMD Regulatory Compliance list indicated no County-registered UST sites on or within 0.5 mile of the SPA (WKA 1999).

Polychlorinated Biphenyls

Prior to 1975, PCBs were commonly used in transformers, capacitors, and fluorescent light ballasts. In 1975, when it was demonstrated that PCBs were highly toxic, manufacture of PCBs was discontinued in the United States. Older pole-mounted electrical transformers, still in use, may contain PCBs.

WKA noted numerous pole-mounted electrical transformers throughout the SPA. Within the SPA, Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric Company (PG&E) own and maintain high-voltage, steel tower-mounted electrical transmission lines. These transmission lines run from northeast to southwest and bisect the northwesterly corner of APNs 067-0100-023 and 067-0090-026 southeast of the intersection of Kiefer Boulevard and Sunrise Boulevard, and southeast of the intersection of North Campus Drive and Rancho Cordova Parkway (see Exhibit 2-17 in Chapter 2 "Alternatives"). One SMUD tower containing a 230-kilovolt (kV) transmission line and a 69-kV sub-transmission line and one PG&E tower containing a 230-kV transmission line are located on the SPA. (MacKay & Somps 2010:3.)

In 1979, SMUD discontinued the purchase of PCB-containing transformers and removed them from its existing inventory. Sites developed after 1979 generally received PCB-free transformers as part of the electrical service provided by SMUD. Some newer transformers are tagged "Non-PCB" with respect to PCB content. However, many transformers within the SPA likely predate 1979, and are not tagged regarding PCB content. No privately-owned transformers were observed within the SPA during field visits by WKA. No obvious evidence of transformer leakage was observed at accessible sites within the SPA (WKA 1999).

HAZARDOUS MATERIALS AND SITES IN THE PROJECT VICINITY

Preparation of the Phase I ESA included a review of Federal, state, and local agency databases for documented hazardous materials on or near the SPA. No sites were listed within the SPA; however, several were found in the project vicinity, and since these sites are still relevant in 2010, they are discussed below.

Kiefer Landfill

Kiefer Landfill is located approximately 0.75 mile southeast of the SPA boundary. The landfill is classified as Class III and accepts a variety of wastes, including mixed municipal, sludge (biosolids), and construction/demolition materials. Samples from some of the monitoring wells at the landfill indicated that wastes have been released to the groundwater. See Section 3.9, "Hydrology and Water Quality" for a detailed discussion of groundwater contaminants at the Kiefer Landfill.

Landfill gas is created when waste in a landfill decomposes. This gas is approximately 50% methane and 40% carbon dioxide. At Kiefer Landfill, gas is collected by a series of wells that connect to the on-site energy facility. Internal combustion engines convert gas into electricity, which is then delivered to SMUD's power distribution system. While this system provides a variety of benefits (e.g., reduction of greenhouse gas emissions, production of energy from a sustainable resource), there is a potential that these landfill gases could escape into the environment and adversely affect air quality. In addition, methane and carbon dioxide can act as carrier gases for trace VOCs and result in groundwater contamination. Due to these concerns, gas and leachate are inspected by the EMD on a monthly basis. To date, no adverse effects on air quality that would affect the SPA have been reported.

Inactive Rancho Cordova Test Site

The Inactive Rancho Cordova Test Site (IRCTS) is located approximately 1 mile north of the northernmost portion of the SPA. The site consists of a 2,728-acre area north of Douglas Road, south of White Rock Road, and east of Sunrise Boulevard. Gold-dredging activities occurred over approximately 70% of the site from the early 1900s until 1962. Since the mid-1960's it has been used by several aerospace companies, which has resulted in groundwater contamination with various VOCs. See Section 3.9, "Hydrology and Water Quality" for a detailed discussion of groundwater contaminants from the IRCTS.

Mather Air Force Base

Mather Air Force Base (AFB) is a state and Federal "Superfund-status" site located approximately 2¼ miles west of the SPA. The site is currently home to the Mather Regional Park, which houses a business airport (Sacramento Mather Airport) and a light industrial area. The Mather Army Aviation Support Facility (AASF) is located on a 30-acre parcel within the Mather Regional Park, and the airport is a joint-use facility, with military operations located on the north side of the runways (California State Military Museum 2007). Mather AFB opened in 1918 as a flight training school for the U.S. military and its allies. It remained a training base until 1993, when it was determined to be surplus under the Base Realignment and Closure Act. Operations at the base, including fire training, spill sites, landfills, and sewage treatment plants, contributed to the current soil and groundwater contamination issues, which occurred at 89 designated sites (EPA 2011). Remediation efforts at Mather AFB are ongoing, and there is still a potential for human exposure through accidental ingestion, inhalation, or direct contact with contaminated soil or groundwater. See Section 3.9, "Hydrology and Water Quality" for a detailed discussion of groundwater contaminants from Mather AFB.

Sacramento Rendering Company

The Sacramento Rendering Company is located at 11350 Kiefer Boulevard; approximately 2,200 feet west of the southwest portion of the SPA boundary. The rendering company “recycles animal by-products which consist of bones from supermarkets, butcher shops, and restaurants” and also receives “waste restaurant grease and trap grease…as well as products from slaughter houses and dead animals, predominantly from dairy ranches in the Sacramento and San Joaquin Valley.” Animal carcasses from turkey and chicken ranches also are brought to their facilities. The facility discharges wastewater to settlement/evaporation ponds located between the plant buildings at a point approximately 1,400 feet southwest of Sunrise Boulevard. The sludges and solids that settle out from the liquid wastewater stream are disposed of off-site. The remaining wastewater is then diluted with groundwater from one of three on-site water supply wells and used to irrigate pastures located east and south of the rendering company, between the settlement/evaporation ponds and Sunrise Boulevard. Irrigated pastures that receive settled-out and diluted wastewaters are located between the settlement/evaporation ponds and Sunrise Boulevard (WKA 1999).

Wastewater discharge at the rendering company is permitted by the Central Valley Regional Water Quality Control Board (RWQCB). The RWQCB-issued operational permit requirements are contained in the RWQCB *Waste Discharge Requirements (WDRs), Order Number 95-038* and *Information Sheet*. Effluent samples are collected monthly and tested for nitrates such as Nitrogen, Total Dissolved Solids, and pH. Quarterly monitoring reports are submitted to the RWQCB. The facility does not have groundwater monitoring wells for checking ambient groundwater in relation to on-site operations of the settlement/evaporation ponds and irrigated pastures. The WDRs indicate that the ponds are underlain by “hardpan clays,” into which “wastewater does not penetrate more than a few inches each year.”

According to EMD records, four USTs that did not meet 1998 upgrade requirements, and thus had an expired permit to operate, were removed from the site on December 10, 1998. Trace concentrations of the fuel oxygenate methyl tertiary butyl ether (MTBE) were found in underlying soils of one of the USTs. Excavation of the underlying soils and resampling still revealed trace concentrations of MTBE at approximately 15 feet below the surface. The facility was transferred for continued oversight into EMD’s *Site Assessment/Mitigation Section* in February 1999. A site assessment *Workplan* was subsequently approved by the County for subsurface drilling to determine the vertical extent of the MTBE discovered in subsurface soils. In the meantime, the RWQCB implemented a policy requiring groundwater sampling and testing when MTBE contamination is documented in subsurface soils.

See Section 3.2, “Air Quality,” for further discussion of toxic air contaminants and odors relating to facilities located near the SPA.

HIGH-VOLTAGE TRANSMISSION LINES

High-voltage transmission lines are defined by the California Department of Education (CDE) as those with a line voltage of 50 kV or more. As discussed above, SMUD and PG&E own and maintain northeast/southwest-trending high-voltage, steel tower-mounted electrical transmission lines that bisect the northwesterly corners of APNs 067-0100-023 and 067-0090-026 southeast of the intersection of Kiefer Boulevard and Sunrise Boulevard, and southeast of the intersection of North Campus Drive and Rancho Cordova Parkway (see Exhibit 2-17 in Chapter 2 “Alternatives”). One 230-kV SMUD transmission line and one 69-kV SMUD sub-transmission line are located within a 200-foot-wide utility easement and one SMUD tower is located on the SPA. A 230-kV PG&E transmission line is within a 75-foot-wide utility easement that is parallel to the SMUD utility easement. One PG&E tower is located on the SPA. (MacKay & Somps 2010:3.)

AIRPORTS AND AIRSTRIPS

No public or private airports are located within 2 miles of the SPA, nor is the SPA located within the boundaries of an airport land use plan. The closest airport to the SPA is Mather Airport, which is located approximately 2¼ miles to the west.

MOSQUITO/VECTOR CONTROL

The mosquito population in the Sacramento Valley is most active in the spring and early summer. The female mosquito needs blood in order to produce eggs. Hosts that can supply blood include reptiles, amphibians, mammals, birds, and humans. All mosquito species are potential vectors of organisms that can cause disease to pets, domestic animals, wildlife, or humans.

The SPA is located within the Sacramento-Yolo Mosquito and Vector Control District (District). The District employs technicians certified by the Vector-Borne Disease Section of California Department of Health Services in pesticide usage, and mosquito and vector identification. The District solves mosquito problems using Integrated Pest Management techniques, which include surveillance and monitoring of mosquito breeding sources, reduction of mosquito breeding sites, community outreach and public education, and the use of chemical and biological methods to control both mosquito larvae and adult mosquitoes (District 2007). The District's mosquito control program is contained in its Mosquito and Mosquito-Borne Disease Management Plan (District 2003, amended 2005).

The District applies chemicals at extremely low rates, as recommended by EPA. Pesticides in use include biological controls, such as *Bacillus* sp.; methoprene, an insect growth regulator; and pyrethrins and pyrethroids, all of which have been evaluated and are regulated by EPA. Biological larvicides include *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus*, which are naturally occurring bacteria. EPA indicates that the microbial pesticides Bti and *B. sphaericus* have undergone extensive testing before registration. They are essentially nontoxic to humans, so there are no concerns about human health effects with Bti or *B. sphaericus* when they are used according to label directions. EPA testing also indicates that there are no risks to wildlife, nontarget species, or the environment associated with these microbial pesticides, when used according to label directions (EPA 2007a). Only mosquitoes, black flies, and certain midges are susceptible to these bacteria. Other aquatic invertebrates and nontarget insects are unaffected. Larvicidal oils and monomolecular films are used to drown the mosquito larvae in their later aquatic stages, when they are not feeding, by forming a thin coating on the surface of the water. For example, methoprene is an insect growth regulator that is target-specific and is designed not to harm mammals, waterfowl, or beneficial predatory insects.

EPA also indicates that pyrethroids can be used for public health mosquito control programs without posing unreasonable risks to human health when applied according to the label. They also do not pose unreasonable risks to wildlife or the environment, although pyrethroids are toxic to fish and to bees. For that reason, EPA has established specific precautions on the label to reduce such risks, including restrictions that prohibit the direct application of products to open water or within 100 feet of lakes, streams, rivers, or bays (EPA 2007b). The District uses pyrethrins and pyrethroids for its adult mosquito fogging program in and around populated areas. Pyrethrins are insecticides that are derived from an extract of chrysanthemum flowers, and pyrethroids are synthetic forms of pyrethrins. These are generally applied by truck-mounted or handheld foggers. These materials used to control both adult and larval mosquitoes are registered with EPA, which evaluates safe use by assessing potential human health and environmental effects associated with use of each product (EPA 2007c).

WILDLAND FIRE HAZARDS

Wildland fires represent a significant threat in the State, particularly during the hot, dry summer months in more isolated areas where steep topography, limited access, and heavy fuel loading contribute to hazardous conditions. Wildland fire may be started by natural processes, primarily lightning, or it may be started by human activities.

The California Department of Forestry and Fire Protection (CAL FIRE) has established a fire hazard severity classification system, which assesses the wildland fire potential based on fuel load, climate, and topography. The classification system provides three classes of fire hazards: Moderate, High, and Very High. Many homes in the High and Very High fire hazard areas are considered by CAL FIRE to be without adequate protection from wildland or structural fires. The SPA is not located within or near wildlands. According to the CAL FIRE, the SPA is not located within a Very High Fire Hazard Severity Zone.

The California Public Resources Code requires the designation of State Responsible Areas (SRAs) (based on amount and type of vegetative cover, beneficial water uses, probable erosion damage, fire risks, and hazards), where the financial responsibility of preventing and suppressing fires falls primarily on the State. Fire protection outside the SRAs is the responsibility of local or Federal jurisdictions. The SPA is not located within an SRA. See Section 3.14, "Public Services," for detailed information about fire protection services.

3.8.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Hazardous Materials Handling

At the Federal level, the principal agency regulating the generation, transport, and disposal of hazardous substances is EPA, under the authority of the Resource Conservation and Recovery Act (RCRA). RCRA established an all-encompassing Federal regulatory program for hazardous substances that is administered by EPA. Under RCRA, EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous substances. RCRA was amended in 1984 by the Hazardous and Solid Waste Amendments of 1984 (HSWA), which specifically prohibits the use of certain techniques for the disposal of various hazardous substances. The Federal Emergency Planning and Community Right to Know Act of 1986 imposes hazardous-materials planning requirements to help protect local communities in the event of accidental release of hazardous substances. EPA has authorized the State of California to implement the Federal RCRA in California, based on the determination that California's Code of Regulations (Title 22, Division 4.5) contains the Federal hazardous waste regulations (RCRA regulations). DTSC is responsible for implementing Title 22.

Worker Safety Requirements

OSHA is responsible at the Federal level for ensuring worker safety. OSHA sets Federal standards for implementation of workplace training, exposure limits, and safety procedures for the handling of hazardous substances (as well as other hazards). OSHA also establishes criteria by which each state can implement its own health and safety program.

Regulation of Polychlorinated Biphenyls

The Toxic Substances Control Act of 1976 (Title 15 of the United States Code [USC], Section 2605) banned the manufacture, processing, distribution, and use of PCBs in totally enclosed systems. PCBs are considered hazardous materials because of their toxicity. They have been shown to cause cancer in animals, and to affect the immune, reproductive, nervous, and endocrine systems; studies also have shown evidence of similar effects in humans (EPA 2007d). The EPA Region 9 PCB Program regulates remediation of PCBs in several states, including California. Title 40 of the Code of Federal Regulations, Section 761.30(a)(1)(vi)(A) states that all owners of electrical transformers containing PCBs must register their transformers with EPA. Specified electrical equipment manufactured between July 1, 1978 and July 1, 1998 that does not contain PCBs must be marked by the manufacturer with the statement "No PCBs" (Section 761.40[g]). Transformers and other items manufactured before July 1, 1978 and containing PCBs, must be marked as such.

Clean Air Act

The Federal CAA was enacted in 1970. The most recent major amendments made by Congress were in 1990. The CAA requires EPA to establish primary and secondary national ambient air quality standards. The CAA also requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). Section 112 of the CAA defines hazardous air pollutants and sets threshold limits. As discussed elsewhere in this section, asbestos-containing substances are regulated by the EPA under the CAA. Additional information about the CAA is contained in Section 3.14, “Air Quality.”

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Hazardous Materials Handling

The California Hazardous Materials Release Response Plans and Inventory Law of 1985 requires preparation of hazardous materials business plans and disclosure of hazardous-materials inventories. A business plan includes an inventory of methods for handling hazardous materials, facility floor plans showing where hazardous materials are stored, an emergency response plan, and provisions for employee training in safety and emergency response procedures (California Health and Safety Code, Division 20, Chapter 6.95, Article 1). Statewide, DTSC has primary regulatory responsibility for management of hazardous materials, with delegation of authority to local jurisdictions that enter into agreements with the State. Local agencies, including the EMD and the City Rancho Cordova, administer these laws and regulations.

Worker Safety Requirements

California OSHA (Cal-OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations within California. Cal-OSHA regulations pertaining to the use of hazardous materials in the workplace (Title 8 of the California Code of Regulations [CCR]) include requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and preparation of emergency action and fire prevention plans. Cal-OSHA enforces hazard communication program regulations that contain training and information requirements, including procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees at hazardous-waste sites. The hazard communication program requires that employers make Material Safety Data Sheets available to employees and document employee information and training programs.

Emergency Response to Hazardous Materials Incidents

California has developed an emergency response plan to coordinate emergency services provided by Federal, state, and local governments and private agencies. Response to hazardous-material incidents is one part of this plan. The plan is managed by the Office of Emergency Services, which coordinates the responses of other agencies, including the California Environmental Protection Agency (CalEPA), California Highway Patrol (CHP), California Department of Fish and Game, Central Valley RWQCB, Sacramento County Sheriff’s Department, and City of Rancho Cordova Police and Fire Departments.

Hazardous Materials Transport

The U.S. Department of Transportation (USDOT) regulates transportation of hazardous materials between states. State agencies with primary responsibility for enforcing Federal and state regulations and responding to hazardous materials transportation emergencies are CHP and California Department of Transportation (Caltrans). Together, these agencies determine container types used and license hazardous-waste haulers for transportation of hazardous waste on public roads.

California Government Code Section 65962.5 (Cortese List)

The provisions of California Government Code Section 65962.5 are commonly referred to as the "Cortese List" (after the Legislator who authored the legislation that enacted it). The Cortese List is a planning document used by the state and local agencies to comply with CEQA requirements in providing information about the location of hazardous materials release sites. California Government Code Section 65962.5 requires CalEPA to develop an updated Cortese List at least annually. DTSC is responsible for a portion of the information contained in the Cortese List. Other California state and local government agencies are required to provide additional hazardous material release information for the Cortese List.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Goals and policies from the *City of Rancho Cordova General Plan* (City General Plan 2006) relating to hazardous materials that are applicable to the Proposed Project and alternatives under consideration are listed in Appendix K.

3.8.3 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or alternatives under consideration were determined to result in a significant impact related to health and safety if they would do any of the following:

- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment or through the routine transport, use, or disposal of hazardous materials;
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one quarter mile of an existing or proposed school;
- be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5;
- result in a safety hazard for people residing or working in the project area where a project is located within an airport land use plan or within two miles of a public or private airport;
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- expose people or structures to a significant risk of loss, injury, or death involving wildland fires.
- create public health hazards from increased exposure to mosquitoes by providing a substantial amount of new habitat for mosquitoes or other vectors; or
- create a safety hazard for aircraft operations based on the presence of water bodies within 5 miles of the Mather Airport.

ANALYSIS METHODOLOGY

This analysis is based primarily on review of the Phase 1 ESA conducted by WKA in 1999; a site visit conducted by AECOM in 2010; a review of aerial photographs of the SPA; and a review of the Cortese List Data Resources online database.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR/EIS

Contain Hazardous Materials Sites Pursuant to Government Code Section 65962.5—The SPA does not contain any sites listed pursuant to Government Code Section 65962.5. Therefore, there would be no impact, and this issue is not evaluated further in this EIR/EIS.

Hazard to Project Residents from Location within Two Miles of an Airport—The SPA is not located within an area that is subject to an airport land use plan or within 2 miles of a public or private airport; thus, there would be no safety hazard for people residing or working in the SPA and this issue is not evaluated further in this EIR/EIS.

Risks Involving Wildland Fires—Because the SPA is not located in a wildland fire hazard zone, there would be no impact related to exposure of people or structures to significant risk of loss, injury, or death in relation to wildfires; therefore, this issue is not evaluated further in this EIR/EIS.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.8-1	**Possible Exposure of Construction Workers, Project Workers, and Residents to Existing Hazardous Materials.** *The SPA could contain unknown hazardous materials, which could affect construction workers and the general public as a result of construction activities.*

NP

Because no new project-related construction would occur under the No Project Alternative, **no direct** or **indirect** impacts from exposure of people to existing hazardous materials would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

Project implementation would involve site grading, excavation for utilities, backfilling, demolition of existing facilities, and construction of new residential units and commercial facilities. As described above in Section 3.8.1, "Affected Environment," there are numerous debris piles on site (which for purposes of this analysis are assumed to still be present) and existing buildings that may have been constructed with asbestos-containing materials and lead-based paints. During construction activities and demolition, construction workers could come in contact with and be exposed to hazardous materials present in these on-site buildings, pole-mounted transformers (i.e., PCBs), and debris piles. Furthermore, the on-site agricultural residences have septic systems which, if not cleaned and closed properly, could result in exposure of construction workers and future residents to hazards materials. In addition, it is unknown if the farm-exempt fuel UST is present within the SPA on APN 067-0100-0015. Former land uses within SPA, such as agricultural uses, may have resulted in a release of hazardous materials into the soil, groundwater, or air. Because the Phase I ESA described above was prepared over 10 years ago and the requirements to prepare these documents has changed, the presence or likely presence of such materials is now considered to be unknown. New sources of contamination could be associated with dumping or residential and agricultural uses (i.e., spills from storage tanks that contain hazardous materials). If hazardous materials exist, construction activities could cause construction workers and the general public to be potentially exposed to harmful substances. Because the presence of hazardous materials within the SPA is unknown, this **direct** impact is considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.8-1: Prepare a Remedial Action Plan, and Conduct Phase I and/or II Environmental Site Assessments and Implement Required Measures if Stained or Odiferous Soil is Discovered.

The project applicants shall implement the following measures before ground-disturbing activities in areas of debris piles, pole-mounted transformers, where demolition will occur, and other areas where evidence of hazardous materials contamination is observed or suspected through either obvious or implied evidence (i.e., stained or odorous soil) to reduce health hazards associated with potential exposure to hazardous substances:

- Prepare a plan that identifies any necessary remediation activities including excavation and removal of contaminated soils and redistribution of clean fill material within the SPA, if necessary. The plan shall include measures for the safe transport, use, and disposal of contaminated soil and building debris removed from the SPA. In the event that contaminated groundwater is encountered during site excavation activities, the contractor shall report the contamination to the appropriate regulatory agencies, dewater the excavated area, and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The project applicants shall be required to comply with the plan and applicable Federal, state, and local laws. The plan shall outline measures for specific handling and reporting procedures for hazardous materials and disposal of hazardous materials removed from the SPA at an appropriate off-site disposal facility.

- If stained or odiferous soil is discovered during project-related construction activities, the project applicants shall retain a registered environmental assessor to conduct a Phase 1 ESA, and if necessary, Phase II ESAs and/or other appropriate testing. Recommendations in the Phase I and II ESAs to address any contamination that is found shall be implemented before initiating ground-disturbing activities in these areas.

- Notify the appropriate Federal, state, and local agencies if evidence of previously undiscovered soil or groundwater contamination (e.g., stained soil, odorous groundwater) or if known or previously undiscovered USTs are encountered during construction activities. Any contaminated areas shall be remediated in accordance with recommendations made by the EMD, Central Valley RWQCB, DTSC, and/or other appropriate Federal, state, or local regulatory agencies.

- Obtain an assessment conducted by SMUD pertaining to the contents of any existing pole-mounted transformers that would be relocated or removed as part of project implementation. The assessment shall determine whether existing on-site electrical transformers contain PCBs and whether there are any records of spills from such equipment. If equipment containing PCB is identified, the maintenance and/or disposal of the transformer shall be subject to the regulations of the Toxic Substances Control Act.

- Retain a licensed contractor to remove all septic systems in accordance with local, state, and federal regulations.

- Retain a Cal-OSHA certified Asbestos Consultant before demolition of any on-site buildings to investigate whether any asbestos-containing materials or lead-based paints are present, and could become friable or mobile during demolition activities. If any materials containing asbestos or lead-based paints are found, they shall be removed by an accredited contractor in accordance with EPA and Cal-OSHA standards. In addition, all activities (construction or demolition) in the vicinity of these materials shall comply with Cal-OSHA asbestos and lead worker construction standards. The materials containing asbestos and lead shall be disposed of properly at an appropriate off-site disposal facility.

Implementation: Project applicants for any particular discretionary development application

Timing: Before the start of construction activities

Enforcement: Central Valley Regional Water Quality Control Board, California Department of Toxic Substances Control, and/or the appropriate Federal, state, or local regulatory agency.

Implementing this mitigation measure would reduce the potentially significant impact from possible human exposure to unknown hazardous materials at the SPA to a **less-than-significant** level under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives because potentially hazardous materials would be identified; a site management plan that specifies remediation activities and procedures to appropriately identify, stockpile, handle, reuse, and/or remove and dispose of hazardous materials would be prepared and implemented; and hazardous materials that are encountered would be removed and properly disposed of or otherwise remediated by licensed contractors in accordance with Federal, state, and local laws and regulations.

IMPACT 3.8-2 **Potential Hazards from Possible Accident Conditions Involving the Release of Hazardous Materials into the Environment or Through the Routine Transport, Use, or Disposal of Hazardous Materials.** *Implementation of the project would involve the storage, use, and transport of hazardous materials, which is regulated by local, state, and Federal regulations.*

NP

Because no new project-related construction would occur under the No Project Alternative, **no direct** or **indirect** impacts to the public would occur through the routine transport, use, disposal, or risk of upset of hazardous materials. ***[Lesser]***

NCP, PP, BIM, CS, ID

Project development with residential and commercial uses would involve the storage, use, and transport of hazardous materials (e.g., asphalt, fuel, lubricants, paint) during construction activities. In addition, commercial uses associated with the project operation could include facilities such as gas stations and dry cleaners that could use on site and routinely transport hazardous materials on and off site. Transportation of hazardous materials on area roadways is regulated by CHP and Caltrans, and use of these materials is regulated by DTSC, as outlined in Title 22 of the CCR. The project applicant(s), builders, contractors, business owners, and others would be required to use, store, and transport hazardous materials in compliance with local, state, and Federal regulations during project construction and operation. Facilities that would use hazardous materials on site after the project is constructed would be required to obtain permits and comply with appropriate regulatory agency standards designed to avoid hazardous waste releases. Because the project construction contractors and businesses during the operational phase are required by law to implement and comply with existing hazardous materials regulations, impacts related to the creation of significant hazards to the public through routine transport, use, disposal, and risk of upset would be considered **less than significant. No indirect** impacts would result. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.8-3 **Potential for Airspace Safety Hazards (Birdstrike) Associated with Project Water Features.** *The project would include the creation of on-site detention basins, which could attract waterfowl, thereby resulting in a potential safety hazard for aircraft flights associated with Mather Field.*

NP

Because no new project-related construction would occur under the No Project Alternative, **no direct** or **indirect** impacts related to birdstrike from creation of on-site water features would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

The SPA is approximately 3.5 miles southeast of Mather Airport. Federal Aviation Administration regulations recommend a separation of at least 5 statute miles from airport facilities to reduce risk of damage to aircraft resulting from high-speed collisions with birds or the ingestion of birds into aircraft engines. Damage or potential damage caused by birds and other wildlife is termed a “strike” or “strike hazard.”

The SPA and Mather Airport are located between the American River (to the north) and Blodgett Reservoir to the southeast. The predominant wildlife habitat between these two water features and surrounding both the SPA and Mather Airport is annual grassland, which supports vernal pools and other seasonal wetland features such as creeks and drainages. The potential for wildlife to pass through or across the approach or departure airspace from Mather Airport while in transit from the American River to Blodgett Reservoir or other water features in the vicinity of the SPA constitutes an existing strike hazard, even without development of the project.

The project would include the construction of 12 detention basins totaling approximately 46 acres of surface area, each of which would range from approximately 1 acre to 7 acres in size. The basins would provide a combination of water quality, peak flow attenuation, hydro-modification, and flow duration control. The basins would temporarily collect water from storm events and other urban runoff, and treat the water before slowly releasing it into the on-site preserve (i.e., Kite Creek). The goal of this system is to prevent an increase in flows and a decrease in water quality over the existing conditions in order to protect the hydrologic integrity of the preserve areas within the SPA and plant and wildlife habitat surrounding the SPA (see Draft SunCreek Specific Plan attached as Appendix C).

The water in the detention basins would be gravity-released and would empty within approximately 48 hours after each storm event. The basins would be empty the vast majority of the time, although they may fill and drain numerous times each winter (Giberson, pers. comm., 2010). Each basin would also include a small, permanently-wet water-quality feature in the floor of the basin that averages about 15% of the total volume of the typical detention facility. This feature would treat low intensity storm and nuisance flows in order to remove suspended solids, heavy metals, and other constituents of urban runoff. Nuisance flows during the summer time would be drained through percolation trenches located in the floor of the basin. Although permanent ponding would occur within the water quality features in the floor of the detention basins, the size of these ponds (ranging from approximately 0.15 acres to 1.05 acres) would be small relative to the total size of the detention basins (Giberson, pers. comm., 2010). Management practices would include periodic weed abatement and other similar vegetation removal to prevent establishment of wetland habitat within the detention facilities. Since permanent ponding features within the wetland basins would approximate a maximum of 7 acres over the entire SPA (15% of the total acreage of proposed detention facilities), the total ponding acreage within the detention facilities would be less than the total acreage of wetland habitat that would be displaced (22.56 acres) from the SPA as a result of implementing the project. This would therefore represent an overall decrease in wetland habitat for waterfowl on the SPA.

In summary, numerous other water bodies that are not far from the SPA (e.g., Blodgett Reservoir, the American River, various seasonal wetland features) would have a much greater attraction for waterfowl than the small amount of wetland features that would be created within the proposed on-site detention basins, and furthermore project development would eliminate approximately 22.56 acres of the existing wetlands (i.e., the existing waterfowl attractants). Therefore, it is unlikely that the construction of detention basins on the SPA would result in an increase in waterfowl and other birds, beyond what already exists, in the immediate area or within the Mather Airport flight zone. Therefore, this **indirect** impact is considered **less than significant**. **No direct** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.8-4 **Possible Exposure of Construction Workers, Project Workers, and Residents to Human Health Hazards Associated with Mosquito-Borne Diseases.** *The project includes construction of detention basins and stormwater canals, which are considered to be breeding habitat for mosquitoes. An increase in mosquitoes could result in an increased incidence of mosquito-borne diseases.*

NP

Because no new project-related construction would occur under the No Project Alternative, **no direct** or **indirect** impacts related to exposure of residents and workers to human health hazards associated with mosquito-borne diseases would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

As discussed in Chapter 2, "Alternatives," the project includes construction of detention basins and stormwater canals. The proposed detention basins would incorporate physical characteristics that would function as biological vector controls. The detention ponds would be designed to percolate flows that exceed the evaporation rate into the ground through specially designed and constructed percolation trenches placed in the bottom of detention basin (MacKay & Somps 2011). This feature would reduce stagnant water surfaces, thereby minimizing the habitat for propagation of mosquito larvae and making it difficult for mosquito larvae to survive. In addition, habitat would be provided for predator fish species to control vectors.

The SPA is located within the Sacramento-Yolo Mosquito Vector Control District. The District employs technicians certified by the California Department of Public Health (CDPH) in pesticide usage. The District has stated that the materials they use to control both adult and larval mosquitoes are the safest and least toxic materials available for public health mosquito control. Pesticides include biological controls, such as *Bacillus* sp.; methoprene, an insect growth regulator; and pyrethrins and pyrethroids.

Because project design would incorporate mosquito control, and because the County considers its control mechanisms to be appropriate and safe for human exposure, and because the measures would not result in a new risk to residents and workers of adverse health effects associated with vector-borne diseases or hazards associated with vector control, this impact would be **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.8-5 **Potential for Accidental Release of Hazardous Materials and Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School**. *The project includes construction of several on-site schools. Project implementation would involve the transport, use, and disposal of hazardous materials, and the potential for accidental release of hazardous materials.*

NP

Because no new schools associated with the project would be built under the No Project Alternative, **no direct** or **indirect** impacts related to hazardous emissions or handling of hazardous wastes within 1/4 mile of a school would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

Implementation of the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives include construction of schools. (Three schools would be constructed under the No USACE Permit Alternative, four schools would be constructed under the Biological Impact Minimization and Increased Development Alternatives, and five schools would be constructed under the Proposed Project and Conceptual Strategy Alternatives.) Hazardous materials would be handled on site as part of project implementation and may also be discovered and released during construction activities, as discussed above under Impact 3.8-1, "Possible Exposure of Construction Workers, Project Workers, and Residents to Existing Hazardous Material" and Impact 3.8-2, "Potential Hazards from Possible Accident Conditions Involving the Release of Hazardous Materials." However, because the project is required by law to implement and comply with existing hazardous materials regulations, there is not an increased risk of accidents associated with the use of hazardous materials during project construction. In the case that previously unknown hazardous materials are discovered during construction activities, potential impacts associated with the risk of release would be reduced to a less-than-significant level with implementation of Mitigation Measure 3.8-1, "Prepare a Remedial Action Plan, and Conduct Phase I and/or II Environmental Site Assessments and Implement Required Measures if Stained or Odiferous Soil is Discovered."

Areas planned as Local Town Centers and Commercial Mixed-Use under the Proposed Project and the other four action alternatives could be developed into service-related businesses, which could produce and/or use hazardous materials or hazardous emissions. Business such as gas stations, automotive mechanics, and dry cleaners handle hazardous materials and could accidentally release chemicals into the air, soil, and groundwater (e.g., gas, oil, tetrachloroethylene), which could potentially affect children at school. However, under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives, there would be no designated Local Town Centers or Commercial Mixed-Use land uses within ¼ mile of a proposed school (see Exhibits 2-20, 2-4, 2-22, 2-24, and 2-26, respectively). Because State CEQA Guidelines CCR Section 15186 establishes 1/4 mile as the distance that potential health impacts to schools should be considered, **direct** and **indirect** impacts associated with hazardous emissions and hazardous materials handling within 1/4 mile of a school would be **less than significant.**

Thus, because the release of hazardous materials and exposure of people to existing hazardous materials would be less than significant, and the land use plans indicates that hazardous materials would not be used within 1/4 mile of project-related schools, the **direct** impact of hazardous emission or handling of hazardous or acutely hazardous materials, substance, or waste within 1/4 mile of an existing or proposed school would be **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

3.8.4 RESIDUAL SIGNIFICANT IMPACTS

Impacts associated with the release of hazardous materials into the environment or through the routine transport, use, or disposal of hazardous materials, airspace safety hazards associated with project water features, hazardous emissions and hazardous materials handling near to schools, and hazards associated with exposure of people to mosquito-borne diseases would be less than significant. Implementation of Mitigation Measure 3.8-1 would reduce impacts related to possible exposure of construction works and the general public to known hazardous materials to a less-than-significant level. Therefore, project implementation would not result in any residual significant impacts related to hazards and hazardous materials.

3.8.5 CUMULATIVE IMPACTS

Health and safety impacts associated with the past or current uses of a project site usually occur on a project-by-project basis, and are generally limited to the specific project site; in this case, the SPA, and immediate vicinity and nearby roadways.

Implementation of the project could result in possible exposure to existing on-site hazardous materials during project construction activities. The five existing rural residences within the SPA may contain hazardous substances including asbestos and lead, have associated septic systems, and/or pole-mounted transformers that could contain PCBs. However, demolition of buildings containing these materials is regulated by EPA and Cal-OSHA, and the project includes a mitigation measure requiring compliance with these regulations. In addition, implementation of Mitigation Measure 3.8-1 would minimize the potential for exposure of people or the environment to hazardous materials encountered during construction activity (e.g., piles of debris, odiferous or stained soils, underground storage tanks, or septic systems). It is unknown whether any of the related project sites contain existing hazards materials (e.g., piles of debris, underground or aboveground storage tanks, septic systems, stained soils [indicating potential contamination], lead-based paints, asbestos-containing materials, or PCBs). However, if hazardous materials are encountered on site during construction of the related projects, the associated impacts would be localized to those projects and would not be additive to other hazardous materials-related impacts on the SPA. Therefore, the project would not result in a cumulatively considerable incremental contribution to a cumulatively significant impact related to exposure to existing hazardous materials.

The SunCreek Specific Plan project, and the related projects, would involve the storage, use, disposal, and transport of hazardous materials (such as asphalt, fuel, lubricants, and solvents) to varying degrees during demolition, construction, and operation. Facilities that would use hazardous materials on site after the project and the related projects are constructed would be required to obtain permits and comply with appropriate regulatory agency standards designed to avoid hazardous waste releases. The storage, use, disposal, and transport of hazardous materials are extensively regulated by various Federal, state, and local agencies, and therefore construction companies and businesses (during the operational phase) that would handle any hazardous substances would be required by law to implement and comply with these existing hazardous-materials regulations. Therefore, a cumulatively significant impact would not occur, and the project would not result in a cumulatively considerable incremental contribution to a cumulatively significant impact associated with hazardous materials storage and transport.

Impacts associated with hazardous emissions and the handling of hazardous materials near to schools are considered a hazard based upon the measurable distance of 1/4 mile. Because there are no schools existing or proposed within 1/4 mile of SPA land that is designated for potentially hazardous operations (e.g., gas stations, automotive repair shops, dry cleaners), the cumulative context is considered to be localized to the SPA; thus, the project would not result in a cumulatively considerable incremental contribution to a cumulatively significant impact associated with hazardous emission and/or the handling of hazardous materials near to schools.

The creation of mosquito-breeding habitat and the associated increase in mosquitoes and mosquito-borne diseases affects the area covered by the Sacramento-Yolo Mosquito Vector Control District. While the District exists due to the existing hazards associated with an existing mosquito population, these populations are monitored. When necessary, the District employs biological vector controls to reduce mosquito populations throughout its service area (which includes the SPA and the related projects). Furthermore, the on-site detention basins would be designed with mosquito controls. Thus, because the project would not result in a substantial increase in mosquito habitat, and because populations would continue to be monitored and controlled by the District, project implementation would not result in a cumulatively considerable incremental contribution to a cumulatively significant impact to human health associated with mosquito-borne diseases.

3.9 HYDROLOGY AND WATER QUALITY

3.9.1 AFFECTED ENVIRONMENT

The SPA is located in eastern Sacramento County in the City of Rancho Cordova. The SPA lies within the eastern edge of the Sacramento Valley, which is a nearly flat alluvial plain that extends almost 180 miles from the Sacramento-San Joaquin Delta on the south to Redding on the north. The topography of the SPA falls gently to the west and southwest with average slopes of approximately 0.006 feet per foot. The climate in the Sacramento Valley is characterized by warm, dry summers with an almost complete absence of rain, and mild winters will relatively light rains.

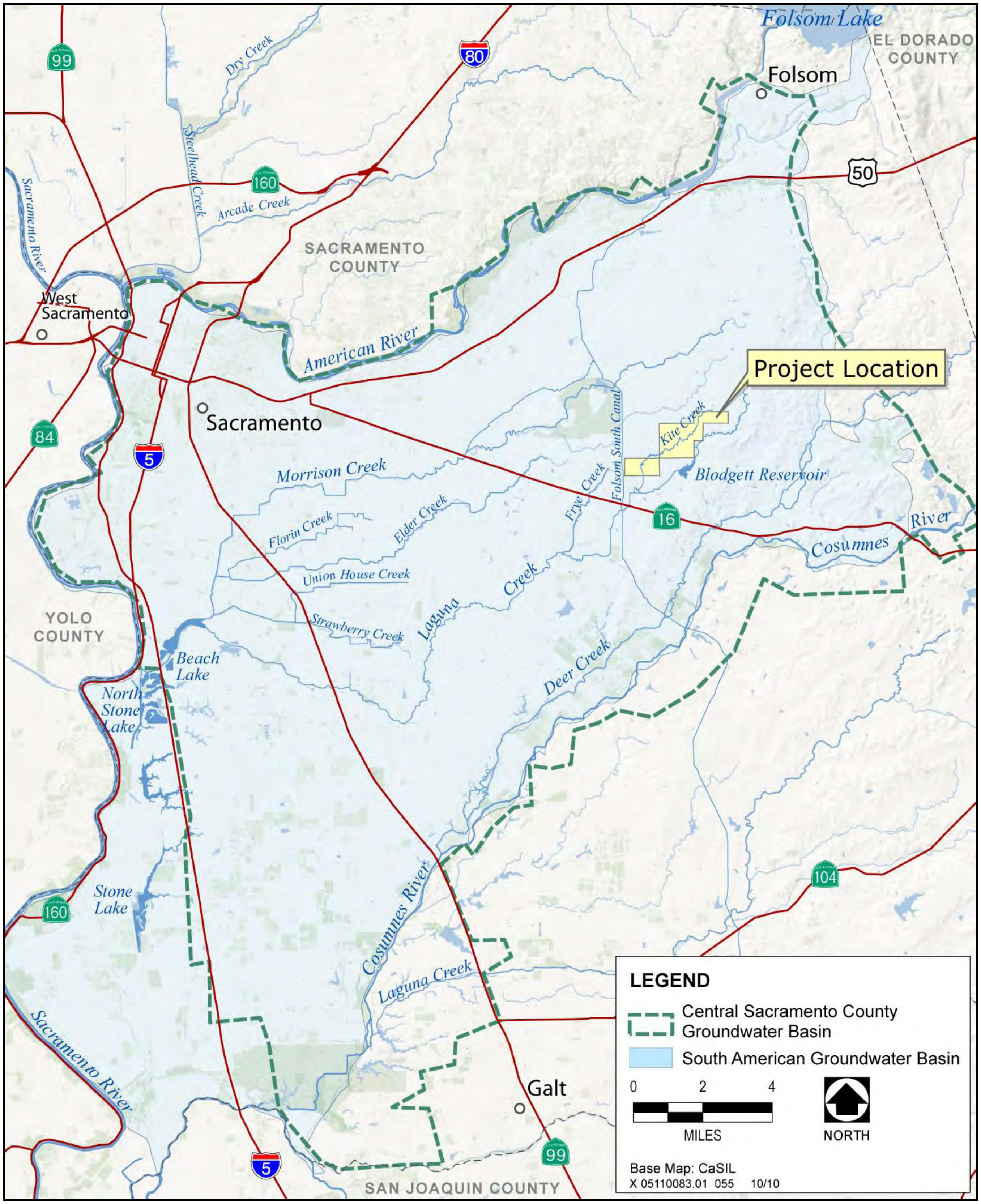
SURFACE WATER HYDROLOGY

The SPA is situated between the American and Cosumnes Rivers to the north and south, and to the east of the Sacramento River (see Exhibit 3.9-1, "Regional Hydrologic Features"). The SPA is comprised mostly of annual grasslands, interspersed with occasional groups of non-native trees, seasonal wetlands, and drainages typical of eastern Sacramento County. The SPA is currently undeveloped land with relatively poor agricultural soils and has been used for dry farming and livestock grazing. The terrain consists of slightly rolling terraces, with elevations ranging from 120 to 230 feet above sea level. The SPA is situated within the upper reaches of the Laguna Creek Watershed. Laguna Creek conveys storm water southwest towards the junction of Sunrise Boulevard and Jackson Highway in well-defined grassy swales located just south of the SPA. Blodgett Reservoir is located between Kiefer Boulevard and Grant Line Road, to the south of the SPA. The Laguna Creek Watershed encompasses approximately 50 square miles of land draining to Laguna Creek and its tributary streams (Sacramento Stormwater Quality Partnership [SSQP] 2009a:Appendix A-4, 162).

Kite Creek is a tributary to Laguna Creek and transverses through the middle of the SPA, generally sloping from the northeast to the southwest. Kite Creek exits the SPA's southern boundary and meanders in a southerly direction approximately 4,000 feet where it joins Laguna Creek south of Blodgett Reservoir. Another unnamed tributary to Laguna Creek flows through the eastern portion of the SPA and connects to Laguna Creek approximately 3,100 feet south of the SPA. Laguna Creek flows in a southwesterly direction through Elk Grove to Morrison Creek, which then connects to Beach Lake, and eventually to the Sacramento River.

A small portion of the northwest corner of the SPA is located in the Morrison Creek Watershed. The Morrison Creek Watershed is located north of the Laguna Creek Watershed. The area adjacent to the SPA within the Morrison Creek Watershed has been developing the last several years. The Montelena Drainage Study (prepared by Wood Rodgers in September 2007, cited in MacKay & Somps 2010b) indicated that a portion of the runoff from the 100-year, 24-hour storm occurring in the Morrison Creek Watershed spills (Morrison Spill) into the Laguna Creek Watershed. The Morrison Spill occurs within an open space preserve area located north of Kiefer Boulevard and east of Sunrise Boulevard. The Morrison Spill traverses through the open space preserve, crosses under Kiefer Boulevard, continues through the SPA, and eventually connects to Kite Creek (MacKay & Somps 2011b). In addition to the Morrison Spill, local flooding currently occurs along Laguna Creek at Jackson Highway and Sunrise Boulevard, to the south of the southwestern corner of the SPA.

A portion of the SunCreek Drainage Study Area is adjacent to an existing single-family development called Anatolia III. Anatolia III is a 200-acre subdivision and is the only developed land within the SunCreek Drainage Study Area. Prior to the Anatolia III development, Kite Creek entered the Anatolia III property's eastern boundary and meandered for approximately 3,000 feet through the undeveloped property until it exited the site through the southern boundary. The Anatolia III development has filled approximately 2,400 feet of the original Kite Creek stream course and routed it around the perimeter of the Anatolia III Project in a trapezoidal cross section channel. In addition to the on-site channel improvements, the Anatolia III project constructed a water quality basin and an off-channel detention basin. The water quality basin and off-channel detention basin are sized to treat and detain the developed Anatolia III design storm runoff to pre-development water quality, runoff flow rates, and volumes. A



Sources: DWR 2010, Sacramento Central Groundwater Authority 2008, AECOM 2010

Regional Hydrologic Features **Exhibit 3.9-1**

construction defect at the downstream end of the Anatolia III channel and Kiefer Boulevard box culverts has resulted in a backwater condition occurring within the box culverts and the lower reaches of the Anatolia III channel.

The most recent Federal Emergency Management Agency's (FEMA) Flood Insurance Study (FIS) Flood Insurance Rate Maps (FIRMs) revised September 30, 1988, situates the SPA in the unshaded Zone X (see Exhibit 3.9-2) (MacKay & Somps 2011b). Unshaded Zone X is an area of minimal flood hazard, located outside the 500-year flood and protected by levees from the 100-year flood. In addition, the background report to the Sacramento County General Plan (as amended) does not identify the SPA as being located in an area historically prone to flooding (County of Sacramento Undated:371). However, the California Department of Water Resources (DWR) Awareness Floodplain Mapping Project has identified the area surrounding Laguna Creek, including the SPA, as being within the DWR Awareness Floodplain (County of Sacramento Undated:376). DWR Awareness Floodplain areas are flood-prone areas that are not mapped under the FEMA National Flood Insurance Program.

Folsom Dam, the largest dam on the American River, provides a maximum storage capacity of one million acre-feet of water in Folsom Lake, which is a major source of surface water for the region and provides flood protection. The SPA is not located within the Folsom Dam failure flood area (County of Sacramento Undated:384, Figure III-4).

The Sacramento County Water Agency (SCWA)'s service area (i.e., Zone 40) encompasses the SPA and SCWA would be the primary water purveyor. The Zone 40 area is separated into three major service areas, of which the SPA is located in the North Service Area (NSA). Zone 41 would be responsible for the operations and maintenance of all the water supply facilities within the SPA and the project vicinity and would serve as the retail water supplier. SCWA is operated by the Sacramento County Department of Public Works, Water Resources Division, and is authorized to provide water supply, drainage, and flood control for all of Sacramento County.

GROUNDWATER HYDROLOGY

The SPA is located within the Central Sacramento County Groundwater Basin (i.e., Central Basin). The Central Basin is roughly bordered to the north by the American River, to the south by the Cosumnes and Mokelumne Rivers, to the west by Interstate 5 and the Sacramento River, and to the east by the Sierra Nevada foothills. The Central Sacramento County Groundwater Forum (CSCGF) was formed in February 2002 to provide recommendations on a basin governance body, and the CSCGF defined the Central Basin boundary using the Sacramento County groundwater model. The model took into account the hydrogeologic boundaries and the political boundaries of organized water purveyors/districts, cities, and the County of Sacramento (SCWA et al. 2006:ES-4).

The Central Basin boundary essentially overlies the South American Subbasin that is used by DWR; however, the boundaries are slightly different because the Central Basin boundary was developed from the Sacramento County groundwater model grid (see Exhibit 3.9-1, "Regional Hydrologic Features"). The South American Subbasin, of which the Central Basin is a portion, is defined as the area bounded on the west by the Sacramento River, on the north by the American River, and on the south by the Cosumnes and Mokelumne rivers. The Sierra Nevada mountains represent the approximate eastern edge of the alluvial basin, where little groundwater flows into or out of the groundwater basin from the Sierra Nevada foothills. There is, however, interaction between groundwater of adjacent subbasins at greater depths (DWR 2004).

Groundwater underlying the Central Basin is contained within a shallow aquifer (Laguna or Modesto Formation) and in a deep aquifer (Mehrten Formation). The Laguna or Modesto Formation consists of older alluvial deposits of loosely to moderately compacted sand, silt, and gravel deposited in alluvial fans. These deposits are moderately permeable and have a thickness of about 100 to 650 feet (DWR 2004). The deeper, Mehrten Formation is a sequence of fragmented volcanic rocks, which crops out in a discontinuous band along the eastern margin of the basin. It is composed of intervals of black volcanic sands, stream gravels, silt, and clay interbedded with intervals of dense tuff breccia. The sand and gravel intervals are highly permeable and the tuff breccia intervals act as confining layers. The thickness of the Mehrten Formation is between 200 and 1,200 feet. Groundwater is located from 20 to 100 feet below the ground surface (bgs) depending on when and where the measurement is taken. The base of the potable water portion of the deep aquifer averages approximately 1,400 feet bgs.

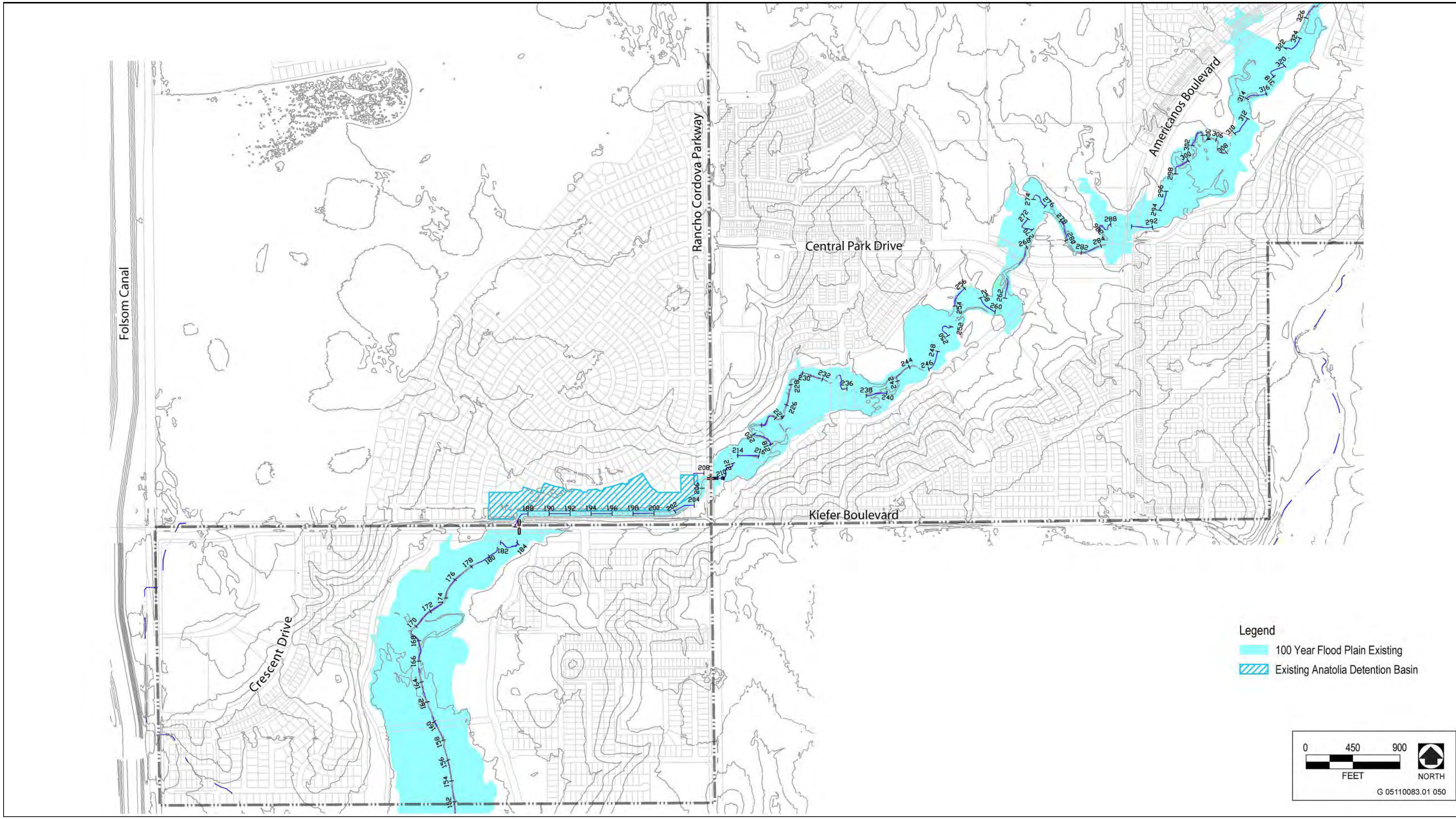
The City of Rancho Cordova covers a shallow unconfined aquifer system that is part of the South American Subbasin. The shallow unconfined aquifer system is approximately 200 hundred feet bgs and a deeper confined groundwater aquifer system ranges from a few hundred feet to over 2,000 feet bgs (City of Rancho Cordova. 2006b:4.9-11). The deep aquifer is separated from the shallow aquifer by a discontinuous clay layer that serves as a semi-confining layer, but is not completely impermeable.

Intensive use of groundwater over the past 60 years has resulted in a general lowering of groundwater elevations. Over time, isolated groundwater depressions have grown and coalesced into a single cone of depression that is centered in the southwestern portion of the Central Basin, approximately 15 miles southwest of the SPA. Groundwater level trends through much of the Central Basin have generally declined consistently from the 1950s and 1960s to about 1980 by 20–30 feet (SCWA et al. 2006:2-27). From 1980 through 1983, water levels recovered by about 10 feet and remained stable until the beginning of the 1987-1992 drought, when water levels declined by about 15 feet. From 1995 to 2003, most groundwater levels in the Central Basin recovered generally higher than levels prior to the 1987–1992 drought; however, wells in the vicinity of Rancho Cordova appear to have recovered less than the other wells in the subbasin since 1995 (generally less than 10 feet) (DWR 2004). The CSCGF determined the estimated long term average annual sustainable yield of groundwater from the Central Basin to be 273,000 acre-feet per year (afy) (SCWA et al 2006:ES-5). Currently, groundwater extractions are estimated to be 250,000 afy.

Recharge of the aquifer system occurs along active river and stream channels where extensive sand and gravel deposits exist, particularly along the American, Cosumnes, and Sacramento River channels. Additional recharge occurs along the eastern boundary of Sacramento County at the transition point from the consolidated rocks of the Sierra Nevada to the alluvial-deposited basin sediments (SCWA et al. 2006:2-26). This recharge is classified as subsurface recharge along with underground flow into and out of the Central Basin with adjacent groundwater basins. Other sources of recharge include deep percolation from applied surface water and precipitation. Induced recharge can occur from recharge basins and injection of water through wells. Due to soil characteristics within the City of Rancho Cordova, groundwater recharge capabilities are considered low (City of Rancho Cordova 2006b:4.9-12). Recharge capabilities on the SPA are generally characterized as poor; however, a portion of the SPA along Laguna and Kite Creeks has moderate to high recharge capabilities, as it consists of unconsolidated deposits along the floodplain (County of Sacramento 2009:18, Figure 4). The specific hydrologic soils groups found in the SPA primarily consist of Type D soils, which have the highest runoff potential (lowest infiltration rates), and Type C soils are found along the creeks. See Exhibit 3.7-1 in Section 3.7, "Geology, Soils, Minerals, and Paleontological Resources" for a depiction of on-site soil types.

The Central Sacramento County Groundwater Management Plan (CSCGMP) was completed in 2006 by Central Sacramento County Groundwater Basin stakeholders, in coordination with the Sacramento County Water Agency, to establish a framework for maintaining a sustainable groundwater resource for the various users overlying the basin in Sacramento County between the American and Cosumnes Rivers (SCWA et al. 2006:ES-1). The CSCGMP assists overlying water users in maintaining a safe, sustainable, and high quality groundwater resource within a given groundwater basin. The five basin management objectives that have been proposed for the Central Basin are listed below. Each objective focuses on managing and monitoring the basin to benefit all groundwater users in the basin and are intended to be specific enough to result in numerical criteria for the basin, but also able to be modified or adapted to new information on groundwater basin behavior over time:

- ► Maintain the long-term average groundwater extraction rate at or below 273,000 afy.
- ► Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum.



Source: MacKay & Somps 2011b, Adapted by AECOM in 2011

100-Year Floodplain Map **Exhibit 3.9-2**

- Protect against any potential inelastic land surface subsidence by limiting subsidence to no more than 0.007 feet per 1 foot of drawdown in the groundwater basin.

- Protect against any adverse impacts to surface water flows in the American, Cosumnes, and Sacramento rivers.

- Water quality objectives for several constituents of concern:

  - Maintain total dissolved solids (TDS) concentration of less than 1,000 milligrams per liter (mg/L);

  - Maintain nitrate (NO_3) concentration of less than 45 mg/L; and

  - Monitor volatile organic compounds (VOC) migration and consider any measurable trace of VOC in private or public wells as significant.

WATER QUALITY

Surface Water

Laguna Creek and Kite Creek do not currently have any specific designated beneficial uses attributed to them in the water-quality control plan (Basin Plan) adopted by the Central Valley Regional Water Quality Control Board (RWQCB) (described in Section 3.9.2 “Regulatory Framework” below). Consequently, the Central Valley RWQCB applies the Basin Plan’s “tributary rule” and assigns to these creeks the beneficial uses designated for the nearest downstream location. The Central Valley RWQCB also regulates waste discharges in undesignated streams to ensure that downstream water quality conditions and beneficial uses are not degraded. Thus, these creeks are subject to regulation for the existing designated uses in their receiving waterbodies. Thus, Laguna and Kite Creeks are subject to regulation for the existing designated uses in the Sacramento River, which consist of:

- municipal and domestic water supply;
- agricultural supply;
- industrial supply and hydropower generation;
- contact and noncontact recreation;
- warm and cold freshwater migration and spawning habitat; and
- wildlife habitat.

The 2006 version of the Section 303(d) list for California issued by the Central Valley RWQCB (discussed below in Section 3.9.2 “Regulatory Framework”) identifies impaired status for a 26-mile stretch of Morrison Creek for chlorpyrifos (an insecticide), from Elk Grove/Florin Road to Beach Lake. However, in the 2009 Final Staff Report on proposed changes to the 303(d) list, this listing for chlorpyrifos was removed and new listings have been added for pentachlorophenol (PCP) (a pesticide) and pyrethroids (insecticides) (Central Valley RWQCB and CalEPA 2009). The source of PCP is unknown and the source of pyrethroids is listed as agriculture and urban runoff/storm sewers. The expected total maximum daily load (TMDL) completion date for both of these pollutants is 2021. Morrison Creek has also been listed as impaired for diazinon, with potential sources listed as agriculture, and the TMDL for diazinon was approved by the U.S. Environmental Protection Agency (EPA) in 2003. Chlorpyrifos and diazinon are organophosphorus pesticides used for urban and agricultural pest control. Neither Laguna Creek nor Kite Creek are listed on the 303(d) list as impaired.

Laguna Creek eventually flows to the Sacramento River, which is listed on the 303(d) list as impaired between Knights Landing and the Delta (16 miles) for mercury and unknown toxicity (Central Valley RWQCB 2006). The potential source of mercury is abandoned mines/resource extraction and the source of the unknown toxicity is unknown. In addition, the 2009 Final Staff Report on proposed changes to the 303(d) list has also listed the Sacramento River between Knights Landing and the Delta for chlordane, DDT, and dieldrin (pesticides) from agricultural sources (Central Valley RWQCB and CalEPA 2009). Expected TMDL completion dates for these pollutants are 2021, 2021, and 2022, respectively. In addition, the Sacramento River has been listed as impaired for polychlorinated biphenyls (PCBs) from unknown sources, with an expected TMDL completion date of 2021. Finally, diazinon is no longer listed as an impairment for the Sacramento River, as a TMDL for diazinon was approved by the EPA in 2003.

In the 2009 Final Staff Report on proposed changes to the 303(d) list, Beach Lake is proposed for listing for mercury from resource extraction with an expected TMDL completion date of 2021 (Central Valley RWQCB and CalEPA 2009).

Water quality monitoring in Laguna Creek was conducted during the 2008/2009 fiscal year (July 1, 2008 – June 30, 2009) in compliance with the Sacramento Municipal Separate Storm Sewer System National Pollutant Discharge Elimination System (NPDES) Stormwater Permit No. CAS082597. Monitoring activities required by the permit included urban tributary (creek) water quality monitoring, bioassessment, and additional pesticide monitoring. In addition, continuous monitoring was conducted for pH, temperature, and dissolved oxygen in Laguna Creek during three wet-weather events. The closest water quality monitoring stations were located approximately 10 miles west of the SPA, to the east and west of Highway 99 (at Franklin Boulevard and East Stockton Boulevard).

Continuous flow stage recorders and water quality data collection devices were initially installed at Laguna Creek at Franklin Boulevard (location LC01) on September 16, 2008, but were subsequently relocated to Laguna Creek at Hwy 99/Stockton Blvd (location LC02) on December 10, 2008 due to stagnant flow conditions at the Franklin site that showed little response to wet-weather events. Continuous monitoring data values taken during three wet-weather events were averaged and are provided in Table 3.9-1.

Table 3.9-1
Average Hydrologic Parameters in Laguna Creek

Constituent	Laguna Creek at Franklin Blvd (LC01) October 31, 2008	Laguna Creek at Hwy 99/ Stockton Blvd (LC02) December 14, 2008	Laguna Creek at Hwy 99/ Stockton Blvd (LC02) February 11, 2009
pH	7.0	7.0	6.7
Dissolved Oxygen (mg/L)	4.6	5.8	[1]
Temperature (°C)	16.0	7.8	9.5
EC (uS/cm)	136.5	223.6	150.8
Turbidity (NTU)	35.2	23.8	60

Notes:
mg/L = milligrams per liter (parts per million); uS/cm = microsiemens per centimeter; EC = electrical conductivity;
NTU = nephelometric turbidity units
1 No reading available.
Source: SSQP 2009a Appendix A-7, 11, 15, and 19.

For the 2008/2009 monitoring years, Laguna Creek at both the Franklin Boulevard and Hwy 99/Stockton Boulevard sampling locations showed dissolved oxygen levels below the water quality objective of 7 mg/L for coldwater spawning and pH that was within the Basin Plan range of 6.5 to 8.5. Exceedances of water quality objectives were reported in the 2008/2009 monitoring report and are presented in Table 3.9-2 (SSQP 2009a: Appendix A-7, 56). Monitoring of Laguna Creek showed exceedances for dissolved copper, *E. coli*, fecal coliform, and for the polycyclic aromatic hydrocarbon (PAHs) constituents benzo(a)pyrene, benzo(b)flouranthene, chrysene, and indeno(1,2,3-cd)pyrene. No other exceedances of water quality objectives were reported (SSQP 2009a).

Table 3.9-2 2008/09 Exceedances of Water Quality Objectives in Laguna Creek at Franklin Blvd and Hwy 99/Stockton Blvd				
Constituent	**Water Quality Objective as Specified in the NPDES Permit**	**Laguna Creek at Franklin Blvd (LC01) October 31, 2008**	**Laguna Creek at Hwy 99/Stockton Blvd (LC02) December 15, 2008**	**Laguna Creek at Hwy 99/Stockton Blvd (LC02) February 11, 2009**
Chrysene (µg/L)	0.0044[1]	0.0096	NA	0.0165
Copper – Dissolved (µg/L)	4.27[2]	5.3	NA	NA
Escherichia Coli (MPN/100mL)	235[3]	30,000	NA	1,100
Fecal Coliform (MPN/100mL)	400[3]	50,000	1,300	1,100
Benzo(a)pyrene (µg/L)	0.0044[1]	NA	NA	0.0124
Benzo(b)flouranthene (µg/L)	0.0044[1]	NA	NA	0.0067
Indeno(1,2,3-cd)pyrene (µg/L)	0.0044[1]	NA	NA	0.0072

Notes:
mg/L = milligrams per liter (parts per million); µg/L = micrograms per liter (parts per billion); NA = not applicable
MPN/100mL = most probable number per 100 milliliters
1 California Toxics Rule, human health based on consumption of water and organisms
2 California Toxics Rule, freshwater aquatic life
3 Basin Plan
Source: SSQP 2009a Appendix A-7, Tables 34, 56.

Wet and dry weather water quality data for Laguna Creek at Franklin Blvd is also available in Appendix F of the "Technical Study of Hydrology, Geomorphology and Water Quality in the Laguna Creek Watershed" prepared in support of the Laguna Creek Watershed Management Action Plan and the Upper Laguna Creek Corridor Master Plan (Geosyntec 2007:Table 3-3a and Table 3-3b).

Groundwater

Water quality in the shallow aquifer zone is considered to be good with the exception of arsenic detections in a few locations. The shallow aquifer is typically used for private domestic wells requiring no treatment unless high arsenic values are encountered, in which case other water-bearing units are targeted. Water in the deep aquifer typically has higher concentrations of TDS, iron, and manganese and typically requires treatment (SCWA et al. 2006:2-24). Iron and manganese are known to cause mineral deposits and affect the taste of water. At depths of approximately 1,400 feet or greater, TDS concentrations exceed 2,000 mg/L and groundwater is considered non-potable unless treated by reverse osmosis (SCWA et al 2006:2-30).

The three major groundwater types are: magnesium calcium bicarbonate or calcium magnesium bicarbonate; magnesium sodium bicarbonate or sodium magnesium bicarbonate; and sodium calcium bicarbonate or calcium sodium bicarbonate. Groundwater in the basin is generally characterized as calcium magnesium bicarbonate or magnesium calcium bicarbonate (DWR 2004). Total dissolved solids ranges in the South American Basin are from 24 to 581 mg/L and averages 221 mg/L based on 462 records.

There are several sources of groundwater contamination within the Central Basin. These sources include: Mather Field, Aerojet, Boeing, the former Sacramento Army Depot, the Union Pacific railyards, and present and former landfills (SCWA et al. 2006:ES-4). The known extent of contamination from these sources does not extend south of Douglas Road, with the exception of contamination from the inactive Boeing Rancho Cordova Test Site. None of the groundwater contamination extends underneath the SPA.

Kiefer Landfill

Kiefer Landfill is located approximately three-quarter mile southeast of the SPA boundary. The landfill is classified as Class III and accepts a variety of wastes, including mixed municipal, sludge (biosolids), and construction/demolition materials. Samples from some of the monitoring wells at the landfill indicated that wastes have been released to the groundwater. The major groundwater contaminants are VOCs, including perchloroethylene (PCE); trichloroethylene (TCE); 1,1,1-trichloroethane (1,1,1-TCA); 1,2-dichloroethylene (1,2-DCE); benzene; and vinyl chloride. VOCs were first detected in the landfill monitoring wells in 1998, with trace detections in the well closest to the SPA boundary (approximately one-half mile away to the south). The County monitors three water bearing zones, to a depth of 150 feet below mean sea level (msl). The County operates a groundwater extraction and treatment (GET) system on the landfill site, including 50 groundwater monitoring wells in various locations around the landfill. Treated water is discharged southwest of the landfill, over one mile south of the SPA. The contaminant plume is monitored by the landfill operator and results are sent to the Sacramento County Environmental Management Department on a weekly basis. The plume is not located within the SPA boundary.

Inactive Rancho Cordova Test Site (Aerojet/Boeing)

The Inactive Rancho Cordova Test Site (IRCTS) is located approximately one mile north of the northernmost portion of the SPA. The site consists of a 2,728-acre area north of Douglas Road, south of White Rock Road, and east of Sunrise Boulevard. Gold-dredging activities occurred over approximately 70% of the site from the early 1900s until 1962. Since the mid-1960’s it has been used by several aerospace companies including Aerojet and Boeing, which has resulted in groundwater contamination with various VOCs.

Groundwater investigations at the IRCTS have been ongoing since 1984 to characterize the site’s hydrology, evaluate the direction of groundwater flow, assess the extent of groundwater contamination, and provide remediation. The site was divided into three separate groundwater study areas based on the sources of chemicals and their potential effects on the groundwater. These consist of the Western Groundwater Operable Unit, the Northern Groundwater Study Area and the Southern Groundwater Study Area. The Southern Groundwater Study Area (SGSA) is closest to the SunCreek SPA (EDAW [now AECOM] 2006:Section 3.13).

The SGSA was designated to address chemicals in groundwater originating from the Alpha Complex and the Administration Area (Security Park) Operable Units. Numerous monitoring wells and GET wells have been installed at various locations within the SGSA. Additional GET wells were installed along Douglas Road and south of Douglas Road (on land that is part of the Sunrise Douglas Community Plan area) to remediate contaminated groundwater moving south from Security Park. Sampling data indicate that VOCs, mostly TCE and perchlorate, are the primary chemicals of concern in the groundwater, and that the directions of groundwater flow range from south at the Security Park to southwest at other locations further west. The groundwater contaminant plumes from Security Park and Alpha Complex have not migrated beneath the SunCreek SPA. However, the groundwater contaminant plume from Security Park is migrating south, toward the SunCreek SPA. Perchlorate is not present in the plume from Security Park or in the eastern TCE plume from Alpha Complex; however, perchlorate is present within the western side of the TCE plume from the Alpha Complex (EDAW [now AECOM] 2010:Chapter 5). One extraction well and a temporary GET system were installed during 2004 at the intersection of Douglas Road near the center of the IRCTS. The GET system began operating on a limited basis during July 2005 and began continuous operations in October 2005. Two additional extraction wells were installed along Douglas Road during 2005 and were connected to the GET system along with three extraction wells located south of Douglas Road. These wells are intended to remediate contaminated groundwater moving south from the Security Park. The extracted water is pumped from these wells to the GET system and the treated water is discharged to Morrison Creek. The second phase of the groundwater remediation includes the installation of three additional extraction wells on the Ranch at Sunridge project site within the northeastern portion of the existing transmission line easement. The Remedial Action Plan incorporates requirements for progress evaluations and modifications to the remedies recommended in the plan until perchlorate and TCE are removed from the groundwater to the satisfaction of the Central Valley RWQCB.

Mather Field

Mather Field, formerly Mather Air Force Base (AFB) is a state and Federal "Superfund-status" site located approximately 2¼ miles west of the SPA. The site is currently home to the Mather Regional Park, which houses a business airport (Sacramento Mather Airport) and a light industrial area. The Mather Army Aviation Support Facility (AASF) is located on a 30-acre parcel within the Mather Regional Park, and the airport is a joint-use facility, with military operations located on the north side of the runways (California State Military Museum 2007). Mather AFB opened in 1918 as a flight training school for the U.S. military and its allies. It remained a training base until 1993, when it was determined to be surplus under the Base Realignment and Closure Act.

Operations at the base, including fire training, spill sites, landfills, and sewage treatment plants, contributed to the current soil and groundwater contamination issues, which occurred at 89 designated sites (EPA2011). Remediation efforts at Mather Field are ongoing, and there is still a potential for human exposure through accidental ingestion, inhalation, or direct contact with contaminated soil or groundwater.

Chemicals of concern include VOCs, gasoline, diesel fuel, metals, and pesticides. To date, excavation and treatment of soils has remediated all but 13 of the 82 total sites. Although remediation efforts have been in place since 1995, there are still five distinct groundwater plumes. Contaminants associated with the plumes include benzene, carbon tetracholoride, chloromethane, 1 and2-dicholoroethance, methylene chloride, TCE, and tetrachloroethylene. Remediation efforts have resulted in decreased concentrations of hazardous chemicals (EPA 2011).

The closest Mather Field contaminant plume is located approximately 1½ miles west of the SPA and the plumes are generally migrating to the southwest, away from the SPA.

The depth to groundwater in the project vicinity is approximately 130 feet (EDAW [now AECOM] 2006:Section 3.13). The project is expected to rely primarily on surface water supplied by the North Service Area Pipeline (NSAP). The small amount of water that could be used at full project buildout to meet peaking demands (if needed) from on-site SCWA groundwater wells is not expected to result in a substantial change in the movement of the contaminated groundwater plumes.

GEOMORPHOLOGY

A geomorphic assessment of Kite Creek was conducted at the SPA in 2008 and Kite Creek was delineated into two reaches, lower and upper Kite Creek (cbec inc 2008 [Appendix A within DEIR/DEIS Appendix D]). Depending on the location along the creek, the contents of the creek bed range from silty sand absent of gravels, to a gravel bed with fines (cbec inc 2008:7).

The lower reach of Kite Creek extends downstream of Kiefer Boulevard and is surrounded by heavily grazed grasslands with abundant cattle trails into and crossing the creek. Approximately 1,200 feet downstream of Kiefer Boulevard in this reach, the creek appears to have been realigned and straightened and signs of seasonal flooding were observed (cbec inc 2008:3). The lower reach of Kite Creek has incised, or downcut, up to 3-4 feet and overall, the lower reach is actively incising with slumping, eroding banks. The overall erodability risk classification of the lower reach is high, meaning that the creek has already undergone substantial levels of degradation and therefore will be highly susceptible to future anthropogenic (i.e., human-caused) disturbances (cbec inc 2008:4).

The upper reach of Kite Creek, located upstream of Rancho Cordova Parkway, has more stable conditions than the lower reach and has been less anthropogenically affected to date. Little development has occurred in the upper reach at this time and therefore this reach has only been affected by grazing and other agricultural activities (cbec inc 2008:6). This reach is dimensionally smaller with lower banks as compared to the lower reach of Kite Creek and has not been artificially straightened. The impacts of cattle are also not as prevalent, but there is some bank slumping and a few creek modifications have been made, including berming and culvert crossings. The overall erodability risk classification of the upper reach of Kite Creek is “medium,” meaning that the channel has undergone partial degradation (cbec inc 2008).

3.9.2 REGULATORY FRAMEWORK

Numerous Federal, state, regional, and local laws, rules, regulations, plans, and policies define the framework for regulating hydrology and water quality in the SPA and surrounding area. The following discussion focuses on hydrology and water quality requirements applicable to the project.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Clean Water Act

The EPA is the lead Federal agency responsible for managing water quality. The Clean Water Act (CWA) of 1972 is the primary Federal law that governs and authorizes EPA and the individual States to implement activities to control water quality. The various elements of the CWA that address water quality and are applicable to the project are discussed below. Wetland protection elements administered by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA, including permits for the discharge of dredged and/or fill material into waters of the U.S., are discussed in Section 3.3, “Biological Resources.”

Water Quality Criteria and Standards

Under Federal law, EPA has published water quality regulations under Volume 40 of the Code of Federal Regulations. Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the U.S. As defined by the CWA, water quality standards consist of two elements: (1) designated beneficial uses of the water body in question, and (2) criteria that protect the designated uses. Section 304(a) requires EPA to publish advisory water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. EPA is the Federal agency with primary authority for implementing regulations adopted under the CWA. EPA has delegated the State of California as the authority to implement and oversee most of the programs authorized or adopted for CWA compliance through the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act), described below.

National Pollutant Discharge Elimination System Permit Program

The NPDES permit program was established in the CWA to regulate municipal and industrial discharges to surface waters of the U.S. A discharge from any point source is unlawful unless the discharge is in compliance with an NPDES permit. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

In November 1990, EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity if the project would disturb more than 5 acres. Phase 2 of the NPDES stormwater permit regulations, which became effective in

March 2003, required that NPDES permits be issued for construction activity for projects that disturb 1 acre or more. Phase 2 of the municipal permit system (known as the NPDES General Permit for Small Municipal Separate Storm Sewer Systems [MS4s]) required small municipal areas of less than 100,000 persons to develop stormwater management programs. The nine RWQCBs in California are responsible for implementing the NPDES permit system (see additional information below).

Section 401 Water Quality Certification or Waiver

Under Section 401 of the CWA, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the U.S.) must first obtain a certificate from the appropriate state agency stating that the fill is consistent with the state's water quality standards and criteria. In California, the authority to either grant water quality certification or waive the requirement is delegated by the SWRCB to the nine RWQCBs. The Proposed Project Alternative would require a Section 401 water quality certification because it would require a Section 404 permit and is under the jurisdiction of the Central Valley RWQCB.

Antidegradation Policy

The Federal antidegradation policy, established in 1968, is designed to protect existing uses, water quality, and national water resources. The Federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- Existing in-stream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

Safe Drinking Water Act

Under the Safe Drinking Water Act (Public Law 93-523), passed in 1974, EPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA's primary and secondary maximum contaminant levels (MCLs), which are applicable to treated water supplies delivered to the distribution system. MCLs and the process for setting these standards are reviewed triennially. Amendments to the Safe Drinking Water Act enacted in 1986 established an accelerated schedule for setting MCLs for drinking water.

EPA has delegated to the California Department of Public Health (CDPH) the responsibility for administering California's drinking-water program. CDPH is accountable to EPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by EPA. The applicable state primary and secondary MCLs are set forth in Title 22, Division 4, Chapter 15, Article 4 of the California Code of Regulations (CCR). Provisions of the Safe Drinking Water Act would apply to water supplies being sought for the project.

Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Section 303(d) requires that the state develop a TMDL for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. The TMDL can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows links between loading reductions and the attainment of water quality objectives. The EPA must either approve a TMDL prepared by the state or, if it disapproves the state's TMDL, issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated.

Federal Emergency Management Agency

FEMA administers the National Flood Insurance Program to provide subsidized flood insurance to communities that comply with FEMA regulations that limit development in floodplains. FEMA also issues FIRMs that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection covered by the FIRMs is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 (0.01 annual exceedance probability [AEP]) (i.e., the 100-year flood event). As developments are proposed and constructed FEMA is also responsible for issuing revisions to FIRMs, such as Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR) through the local agencies that work with the National Flood Insurance Program. Requirements of California Senate Bill (SB) 5 regarding the 200-year flood (i.e. the 1-in-200 [0.005 AEP]) are discussed below.

U.S. Army Corps of Engineers Sacramento and San Joaquin River Basins Comprehensive Study

The Sacramento and San Joaquin River Basins Comprehensive Study is a joint effort by the Central Valley Flood Protection Board (formerly the State Reclamation Board) and USACE, in coordination with Federal, state, and local agencies, groups, and organizations in California's Central Valley, to develop a comprehensive plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River Basins. The study is a regionwide planning effort, rather than a regulatory program; however, consistency with its goals and objectives is important for any project affecting flood control in the Sacramento and San Joaquin River basins.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

In California, the SWRCB has broad authority over water-quality control issues for the state. The SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the state by the Federal government under the CWA. Other state agencies with jurisdiction over water quality regulation in California include CDPH (for drinking-water regulations), the California Department of Pesticide Regulation, the California Department of Fish and Game (DFG), and the Office of Environmental Health Hazard Assessment (OEHHA).

Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt Basin Plans for all areas in the region and establish water quality objectives in the plans. California water quality objectives (or "criteria" under the Clean Water Act) are found in the Basin Plans adopted by the SWRCB and each of the nine RWQCBs. The Central Valley RWQCB is responsible for the regional area in which the SPA is located.

TITLE 22 STANDARDS

Water quality standards are enforceable limits composed of two parts: (1) the designated beneficial uses of water, and (2) criteria (i.e. numeric or narrative limits) to protect those beneficial uses. Municipal and domestic supply

(MUN) is among the “beneficial uses” as defined in Section 13050(f) of the Porter-Cologne Act, which defines them as uses of surface water and groundwater that must be protected against water quality degradation. MCLs are components of the drinking water standards adopted by the CDPH pursuant to the California Safe Drinking Water Act. California MCLs may be found in Title 22 of the CCR, Division 4, Chapter 15, Domestic Water Quality and Monitoring. The CDPH is responsible for Title 22 of the CCR (Article 16, Section 64449) as well, which also defines secondary drinking water standards, established primarily for reasons of consumer acceptance (i.e., taste) rather than because of health issues. Table 3.9-3 lists the Title 22 constituent standards, as well as those for the Central Valley Basin Plan above and the California Toxics Rule described below.

Drinking water MCLs are directly applicable to water supply systems “at the tap,” i.e. at the point of use by consumers in their home, office, etc., and are enforceable by the California Department of Health Services. California MCLs, both Primary and Secondary, are directly applicable to groundwater and surface water resources when they are specifically referenced as water quality objectives in the pertinent Basin Plan. In such cases, MCLs become enforceable limits by the State and Regional Water Boards. When fully health protective, MCLs may also be used to interpret narrative water quality objectives prohibiting toxicity to humans in water designated as a source of drinking water (MUN) in the Basin Plan.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act is California’s statutory authority for the protection of water quality. Under the act, the state must adopt water quality policies, plans, and objectives that protect the state’s waters for the use and enjoyment of the people. The act sets forth the obligations of the SWRCB and RWQCBs to adopt and periodically update Basin Plans. Basin Plans are the regional water quality control plans required by both the CWA and Porter-Cologne Act in which beneficial uses, water quality objectives, and implementation programs are established for each of the nine regions in California. The act also requires waste dischargers to notify the RWQCBs of their activities through the filing of reports of waste discharge (RWDs) and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements (WDRs), NPDES permits, Section 401 water quality certifications, or other approvals. The RWQCBs also have authority to issue waivers to RWDs and/or WDRs for broad categories of “low threat” discharge activities that have minimal potential for adverse water quality effects when implemented according to prescribed terms and conditions.

California State Nondegradation Policy

In 1968, as required under the Federal antidegradation policy described above, the SWRCB adopted a nondegradation policy aimed at maintaining high quality for waters in California. The nondegradation policy states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state. The policy provides as follows:

- Where the existing quality of water is better than required under existing water quality control plans, such quality would be maintained until it has been demonstrated that any change would be consistent with maximum benefit to the people of the State and would not unreasonably affect present and anticipated beneficial uses of such water.

- Any activity which produces waste or increases the volume or concentration of waste and which discharges to existing high-quality waters would be required to meet waste discharge requirements, which would ensure (1) pollution or nuisance would not occur and (2) the highest water quality consistent with the maximum benefit to the people of the State would be maintained.

Constituent	Minimum Level Required for Detection[1]	Water Quality Objective (WQO) Source	WQO Value
Conventional Pollutants	**mg/L [2]**		
Oil and Grease	5	Basin Plan	Narrative (3)
Cyanide	0.005	Primary MCL, DPH Title 22 of CCR	150
pH	0–14	Basin Plan	6.5 to 8.5 (range)
Temperature	None	Basin Plan	Narrative (4)
Dissolved Oxygen	Sensitivity to 5 mg/L	Basin Plan	7.0
Bacteria			
Total coliform	<20 mpn/100ml	Basin Plan	Narrative (6)
Fecal coliform	<20 mpn/100ml	Basin Plan	Narrative (6)
E. coli (fresh waters)	<20 mpn/100ml	Basin Plan	Narrative (6)
General	**mg/L [2]**		
Total Phosphorus	0.05	--	--
Turbidity	0.1NTU	Basin Plan	Narrative (7)
Suspended Sediments	2	Basin Plan	Narrative (10)
Total Dissolved Solids	2	Secondary MCL, DPH Title 22 of CCR	500 mg/L
Total Petroleum Hydrocarbon	5	Basin Plan	Narrative (8)
Nitrate	0.1	Primary MCL, DPH Title 22 of CCR	45 mg/L (or 10 mg/L as N)
Nitrite	0.1	Primary MCL, DPH Title 22 of CCR	1 mg/L
Specific Conductance	1umho/cm	Secondary MCL, DPH Title 22 of CCR	900 μmhos/cm
Chloride	2	Secondary MCL, DPH Title 22 of CCR	250 mg/L
Fluoride	0.1	Primary MCL, DPH Title 22 of CCR	2 mg/L
Methyl tertiary butyl ether (MTBE)	1	Primary MCL, DPH Title 22 of CCR	13 μg/L
Metals	**μg/L**		
Aluminum	100	Primary MCL, DPH Title 22 of CCR	1000
Antimony	0.5	Primary MCL, DPH Title 22 of CCR	6
Arsenic	1	EPA Section 304(a)	10 (EPA MCL) 50 (DPH MCL)
Beryllium	0.5	Primary MCL, DPH Title 22 of CCR	4
Cadmium	0.25	Primary MCL, DPH Title 22 of CCR	5
Chromium (total)	0.5	Primary MCL, DPH Title 22 of CCR	50
Copper	0.5	Primary MCL, DPH Title 22 of CCR	1300
Iron	NA	Secondary MCL, DPH Title 22 of CCR	300
Lead	0.5	Primary MCL, DPH Title 22 of CCR	15
Manganese	NA	Secondary MCL, DPH Title 22 of CCR	50
Magnesium		EPA Section 304(a)	10 (EPA MCL) 50 (DPH MCL)

Table 3.9-3
Surface Water and Groundwater Quality Standards of Conventional Contaminants

Constituent	Minimum Level Required for Detection[1]	Water Quality Objective (WQO) Source	WQO Value
Mercury	0.5	Primary MCL, DPH Title 22 of CCR	2
Nickel	1	Primary MCL, DPH Title 22 of CCR	100
Selenium	1	Primary MCL, DPH Title 22 of CCR	50
Silver	0.25	Secondary MCL, DPH Title 22 of CCR	100
Thallium	1	Primary MCL, DPH Title 22 of CCR	2
Zinc	1	Secondary MCL, DPH Title 22 of CCR	5000
Organophosphate Pesticides	**ng/L**		
Chlorpyrifos	10.0	DFG	83 (9)
Diazinon	50.0	DFG	17 (9)
Molinate	2	Primary MCL, DPH Title 22 of CCR	20
Carbofuran	2	Primary MCL, DPH Title 22 of CCR	18
Herbicides	**µg/L**		
Glyphosate	5	Primary MCL, DPH Title 22 of CCR	700
2,4-D	0.02	Primary MCL, DPH Title 22 of CCR	70
2,4,5-TP-SILVEX	0.2	Primary MCL, DPH Title 22 of CCR	50

Notes:
MCL = Maximum Contaminant Level
DPH = California Department of Public Health
CCR = California Code of Regulations
DPH = California Department of Public Health
EPA = U.S. Environmental Protection Agency
WDR = Waste Discharge Requirements
mg/L = milligrams per liter (parts per million)
µg/L = micrograms per liter (parts per billion)
ng/L = nanograms per liter (parts per trillion)
NA = not applicable

1 From the State Implementation Plan of the California Toxics Rule (SIP CTR), Appendix 4. Note that some Water Quality Objective values are lower than the Minimum Level values.
2 Unless otherwise noted.
3 Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
4 The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Central Valley RWQCB that such alteration in temperature does not adversely affect beneficial uses.
5 Placeholder.
6 The most probable number of coliform organisms over any seven-day period shall be less than 2.2MPN/100 ml. This limit would only be applicable for groundwater used for domestic or municipal supply.
7 The 30-day average for turbidity shall not exceed the following limits:
- More than 1 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs.
- More than 20% where natural turbidity is between 5 and 50 NTUs.
- More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.
- More than 10% where natural turbidity is greater than 100 NTUs.

8 The Central Valley RWQCB has prohibited the discharge of oil or any residuary product of petroleum to the waters of the State, except in accordance with waste discharge requirements or other provisions of Division 7, California Water Code.
9 Aquatic Life guidance Value for 4-Day Average Concentration.
10 Central Valley RWQCB Basin Plan Narrative Objective: Water shall not contain constituent concentrations that would cause nuisance or adversely affect beneficial uses.

Sources: Central Valley RWQCB 2007a, 2007b

California Toxics Rule and State Implementation Plan

The California Toxics Rule (CTR) was issued in 2000 in response to requirements of the EPA National Toxics Rule (NTR), and establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The CTR criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are subject CWA Section 303(c). The CTR includes criteria for the protection of aquatic life and human health. Human health criteria (water and organism based) apply to all waters with a Municipal and Domestic Water Supply Beneficial Use designation as indicated in the Basin Plans.

The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Plan (SIP), was adopted by the SWRCB in 2000. It establishes provisions for translating CTR criteria, NTR criteria, and Basin Plan water quality objectives for toxic pollutants into NPDES permit effluent limits, effluent compliance determinations, monitoring for 2,3,7,8-TCDD (dioxin) and its toxic equivalents, chronic (long-term) toxicity control provisions, initiating site-specific water quality objective development, and granting of exceptions for effluent compliance. The goal of the SIP is to establish a standardized approach for the permitting of discharges of toxic effluents to inland surface waters, enclosed bays, and estuaries in a consistent fashion throughout the state.

NPDES Permit System and Waste Discharge Requirements for Construction

The SWRCB and Central Valley RWQCB have adopted specific NPDES permits for a variety of activities that have potential to discharge wastes to waters of the state. The SWRCB's statewide stormwater general permit for construction activity (Order 2009-0009-DWQ) is applicable to all land-disturbing construction activities that would disturb 1 acre or more. The Central Valley RWQCB's general NPDES permit for construction dewatering activity (Order 5-00-175) authorizes direct discharges to surface waters up to 250,000 gallons per day for no more than a 4-month period each year. All of the NPDES permits involve similar processes, including submittal to the Central Valley RWQCB of notices of intent (NOI) to discharge, and implementation of storm water pollution prevention plans (SWPPPs) that include best management practices (BMPs) to minimize those discharges. As mentioned above, the Central Valley RWQCB may also issue site-specific WDRs, or waivers to WDRs, for certain waste discharges to land or waters of the state. In particular, Central Valley RWQCB Resolution R5-2003-0008 identifies activities subject to waivers of RWDs and/or WDRs, including minor dredging activities and construction dewatering activities that discharge to land.

Construction activities subject to the general construction activity permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters. The permit also requires dischargers to consider the use of permanent postconstruction BMPs that would remain in service to protect water quality throughout the life of the project. All NPDES permits also have inspection, monitoring, and reporting requirements. In response to a court decision, the Central Valley RWQCB also implemented mandatory water quality sampling requirements in Resolution 2001-046 for visible and nonvisible contaminants in discharges from construction activities. Water quality sampling is now required if the activity could result in the discharge of turbidity or sediment to a water body that is listed as impaired under Section 303(d) because of sediment or siltation, or if a release of a nonvisible contaminant occurs. Where such pollutants are known or should be known to be present and have the potential to contact runoff, sampling and analysis is required. NPDES permits require the implementation of design and operational BMPs to reduce the level of contaminant runoff. Types of BMPs include source controls, treatment controls, and site planning measures.

Discharges subject to the SWRCB NPDES general permit for construction activity are subject to development and implementation of a SWPPP. The SWPPP includes a site map and description of construction activities and identifies the BMPs that would be employed to prevent soil erosion and discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, and cement) that could contaminate nearby water resources.

On September 2, 2009 the SWRCB approved a new construction general permit (Order 2009-0009-DWQ), which went into effect and replaced Order 99-08-DWQ on July 1, 2010. The new permit differs from Order 99-08-DWQ in the following important ways:

- Risk-Based Permitting Approach: the new general permit establishes three levels of risk possible for a construction site. Risk is calculated in two parts: 1) Project Sediment Risk, and 2) Receiving Water Risk. Risk Level 1 is considered the lowest risk, and Level 3 is considered the highest.

- Rainfall Erosivity Waiver: the new general permit includes the option allowing a small construction site (>1 and <5 acres) to self-certify if the rainfall erosivity value (R value) for their project's given location and time frame compute to be less than or equal to 5.

- Project Site Soil Characteristics Monitoring and Reporting: the new general permit provides the option for dischargers to monitor and report the soil characteristics at their project location. The primary purpose of this requirement is to provide better risk determination and eventually better program evaluation.

- Minimum Requirements Specified: the new general permit imposes more minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance.

- Technology-Based Numeric Action Levels (NAL): the new general permit includes daily average NALs for pH and turbidity, applicable to projects in Risk Level 2.

- Technology-Based Numeric Effluent Limitations (NEL): the new general permit contains daily average NELs for pH during any construction phase where there is a high risk of pH discharge and daily average NELs turbidity for all discharges in Risk Level 3. The daily average NEL for turbidity is set at 500 NTU to represent the minimum technology that sites need to employ (to meet the traditional Best Available Technology Economically Achievable (BAT)/Best Conventional Pollutant Control Technology (BCT) standard) and the traditional, numeric receiving water limitations for turbidity.

- Effluent Monitoring and Reporting: the new general permit requires effluent monitoring and reporting for pH and turbidity in storm water discharges. The purpose of this monitoring is to determine compliance with the NELs and evaluate whether NALs included in the General Permit are exceeded.

- Receiving Water Monitoring and Reporting: the new general permit requires some Risk Level 3 dischargers to monitor receiving waters and conduct bio assessments.

- Post-Construction Storm Water Performance Standards: the new general permit specifies runoff reduction requirements for all sites not covered by a Phase I or Phase II MS4 NPDES permit, to avoid, minimize and/or mitigate post-construction storm water runoff impacts. These requirements would not apply to the project due to Phase 1 NPDES MS4 permit described below.

- Rain Event Action Plan: the new general permit requires certain sites to develop and implement a Rain Event Action Plan (REAP) that must be designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event.

- Annual Reporting: the new general permit requires all projects that are enrolled for more than one continuous three-month period to submit information and annually certify that their site is in compliance with these requirements. The primary purpose of this requirement is to provide information needed for overall program evaluation and pubic information.

- Certification/Training Requirements for Key Project Personnel: the new general permit requires that key personnel (e.g., SWPPP preparers, inspectors, etc.) have specific qualifications or certifications as well as attend state-approved training by September 2, 2011 to ensure their level of knowledge and skills are adequate to ensure their ability to design and evaluate project specifications that will comply with General Permit requirements.

- Linear Underground/Overhead Projects: the new general permit includes requirements for all Linear Underground/Overhead Projects (LUPs).

NPDES Municipal Stormwater Permit Program

The SWRCB Municipal Storm Water Permitting Program regulates storm water discharges from MS4s. MS4 permits are issued in two phases. Under Phase I, which started in 1990, the RWQCBs have adopted NPDES storm water permits for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities. Most of these permits are issued to a group of co-permittees encompassing an entire metropolitan area. As part of Phase II, the SWRCB adopted a General Permit for the Discharge of Storm Water from Small MS4s (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities. The MS4 permits require the discharger to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Section 402(p) of the CWA. The management programs specify what BMPs will be used to address certain program areas. The program areas include public education and outreach; illicit discharge detection and elimination; construction and post construction; and municipal operations. In general, medium and large municipalities are required to conduct water quality monitoring, though small municipalities are not.

Sacramento County and City of Rancho Cordova Phase I National Pollutant Discharge Elimination System MS4 Permit

Sacramento County and the Cities Rancho Cordova, Folsom, Elk Grove, Citrus Heights, Galt, and Sacramento are co-permittees to the Sacramento Areawide NPDES MS4 permit (Sacramento MS4 permit) issued and enforced by the Central Valley RWQCB. First issued in 1990, the latest permit was adopted on September 11, 2008 (NPDES Permit No. CAS082597, WDR Order No. R5-2008-0142). The permittees formed the SSQP, described in more detail in the next section, to coordinate and implement permit compliance activities. A Stormwater Quality Improvement Plan (SQIP) developed for compliance with the NPDES permit is the guiding document for the permittees (SSQP 2009b) and describes the activities that will be implemented to reduce pollutant discharges in urban runoff to the MEP. The SSQP, in association with the City of Roseville, published the “Stormwater Quality Design Manual for the Sacramento and South Placer Regions” (Stormwater Quality Design Manual) in May 2007, which is currently the guiding technical design document for development and major redevelopment in the City of Rancho Cordova (SSQP 2007).

The City has identified a range of BMPs and measurable goals to address the stormwater discharges in the City. As part of the SQIP, there are several regulations/procedures in place that implement the SQIP that include the Grading and Erosion Control Ordinance (Chapter 16.44 of the existing County Code) and construction standards. A key component of this compliance is implementation of the SQIP new development element that requires stormwater quality treatment and/or BMPs in project design for both construction and operation. Postconstruction stormwater quality controls for new development require use of control measures set forth in the Stormwater Quality Design Manual. This includes the sizing and design criteria for regional detention basins as well as the design and maintenance criteria for on-site stormwater quality source, treatment, and runoff reduction measures.

An important component of the Sacramento MS4 permit requires each permittee (including the City) to update and continue to implement the planning and new development element of its SQIP to minimize the short- and long-term impacts on receiving water quality from new development and redevelopment. The permit requires the continued implementation of the permittees’ development standards during the entitlement and CEQA process and the development plan review process. Specifically, the Sacramento MS4 permit identifies the need to address changes in the hydrograph, defined as hydrograph modification or hydromodification, which could result from urbanization of a watershed, and to require low impact development (LID) controls to more closely mimic the pre-developed hydrologic condition. To address hydromodification, the permit requires the permittees to prepare and implement a Hydromodification Management Plan (HMP), which will entail revising development standards and associated technical guidance (aka Stormwater Quality Design Manual). Technical guidance will also be updated to incorporate new LID requirements.

Recycled Wastewater Requirements

A non-potable (i.e., recycled or remediated groundwater) water distribution system would be implemented as part of the project. Wastewater recycling in California is regulated under Title 22, Division 4, of the CCRs under the jurisdiction of CDPH. The intent of these regulations is to ensure protection of public health associated with the use of recycled water. Because the project includes a reclaimed water distribution system, also known as a "purple pipe" system, these regulations would apply (purple is the color commonly used to identify reclaimed water conveyance facilities). The regulations establish acceptable levels of constituents in recycled water for a range of uses and prescribe means for ensuring reliability in the production of recycled water. Using recycled water for nonpotable uses is common throughout the state and is an effective means of maximizing use of water resources. The Central Valley RWQCB establishes water reclamation requirements under the Title 22 regulations and is responsible for implementing wastewater recycling projects.

Senate Bill 5

SB 5, signed into law on October 10, 2007, enacts the Central Valley Flood Protection Act of 2008. Requirements of DWR and the CVFP Board (previously known as the State Reclamation Board) under SB 5 are:

- To prepare and adopt a Central Valley Flood Protection Plan (the Plan) (described below) by 2012.
- To establish 200-year (0.005 AEP) protection as the minimum urban level of flood protection, effective with respect to specific development projects as of 2015 or 2025, as explained below.
    - DWR is directed to produce preliminary (i.e. Best Available) maps for 100-year (0.01 AEP) and 200-year (0.005 AEP) floodplains protected by project levees, and to make them available to cities and counties in the Sacramento-San Joaquin Valley ("Central Valley"). (California Water Code Section 9610[a].) These best available maps were made available on September 8, 2008, and can be found at the California Department of Water Resources website: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/best_available_maps/. The 200-year floodplain (0.005 AEP) as defined by California Water Code Section 9610[a], pursuant to SB 5 has not been delineated within the SPA.
- Sets deadlines for cities and counties in the Central Valley to amend their general plans and their zoning ordinances to conform to the Plan within 24 months and 36 months (i.e., approximately 2014 and 2015), respectively, of its adoption.
- Obligates Central Valley counties to develop flood emergency plans within 24 months of adoption of the Plan.

DWR must propose amendments to the California Building Standards Code (Building Code) to protect areas with flood depths anticipated to exceed 3feet for the 200-year flood (0.005 AEP) event. SB 5 requires that the Building Code amendments are designed to reduce the risk of flood damage and increase safety.

No later than 2015, but potentially sooner depending on when the Central Valley Flood Protection Plan takes effect, SB 5 prohibits local governments from entering development agreements or approving entitlements or permits, including ministerial permits resulting in construction of a new residence in a flood hazard zone, which result in construction of a new residence in a flood zone unless one of three conditions are met:

- flood management facilities provide level of protection necessary to withstand 200-year flood event (0.005 AEP);

- the development agreement or other entitlements include conditions that provide protections necessary to withstand 200-year flood event (0.005 AEP); or

- the local flood management agency has made adequate progress on construction of a flood protection system that shall result in protections necessary to withstand 200-year flood event (0.005 AEP) by 2025.

Central Valley Flood Protection Plan

The Central Valley Flood Protection Plan (as set forth in California Water Code, Section 9614) is a descriptive document that includes the following elements:

- a description of the Flood Management System, its performance, and the challenges to modifying it;

- a description of the facilities included in the State Plan of Flood Control;

- a description of probable impacts of projected climate change, land-use patterns, and other potential challenges;

- an evaluation of needed structural improvements and a list of facilities recommended for removal; and

- a description of both structural and nonstructural methods for providing an urban level of flood protection to currently urbanized areas in the Central Valley.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

City of Rancho Cordova General Plan

Goals and policies of the *City of Rancho Cordova General Plan* (City General Plan 2006) related to hydrology and water quality that are applicable to the Proposed Project and the alternatives under consideration are listed in Appendix K.

Sacramento Stormwater Quality Partnership

The permittees of the NPDES Municipal Stormwater Permit described above, i.e. the Sacramento County and the Cities of Rancho Cordova, Sacramento, Citrus Heights, Elk Grove, Galt, and Folsom, have joined together to form the SSQP. The SSQP is a collaborative partnership that protects and improves water quality in local waterways for the benefit of the community and the environment. The goals of the SSQP are to:

- improve the quality of urban runoff;
- increase public awareness about water quality and encourage pollution prevention behavior;
- strive for countywide consistency between permittee agency programs;
- improve internal communication and coordination to facilitate agency wide compliance;
- use public funds efficiently and effectively; and
- keep apprised of new and evolving regulations that may affect the Program in the future.

The permittees cooperatively participate in decision-making and goal-setting for the monitoring program, are involved in consultant selection and review, and comment on compliance reports and other work products. Annual Reports are produced that describe the activities conducted to comply with the NPDES permit.

The stormwater pollution prevention efforts needed to satisfy the NPDES permit (Order R5-2008-0142) requirements are implemented by the SSQP through its SQIP, either jointly or by the individual permittees. The major categories of SQIP activities, conducted jointly by the SSQP, are:

- program management – including legal authority and funding, inter- and intra-agency coordination, effectiveness assessment;
- target pollutant program (including implementation of plans to target mercury and pesticides);
- monitoring program to satisfy monitoring requirements specified in the monitoring and reporting program (MRP) portion of the NPDES permit;
- some planning and new development standards such as Hydromodification and LID standards;
- special studies; and
- regional public outreach.

3.9.3 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or alternatives under consideration were determined to result in a significant impact related to hydrology and water quality if they would do any of the following:

- violate any water quality standards or waste discharge requirements, including NPDES waste discharge or stormwater runoff requirements, state or Federal antidegradation policies, enforceable water quality standards contained in the Central Valley RWQCB Basin Plan or statewide water quality control plans, or Federal rulemakings to establish water quality standards in California;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a substantial lowering of the level of the local groundwater table;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site; or that would increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site;
- create or contribute runoff water that would exceed the capacity (peak flow) of existing or planned stormwater drainage systems;
- substantially degrade water quality;
- place within a 100-year (0.01 AEP) flood hazard area housing, or structures that would impede or redirect flood flows; or
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

ANALYSIS METHODOLOGY

This analysis relies on information provided by various public agencies, as well as site-specific technical planning studies generated to support proposed development. Hydrology and drainage-related studies reviewed in support of this analysis include the following documents:

- *Regional Master Drainage Study for SunCreek Specific Plan.* (MacKay & Somps Civil Engineers Inc. 2011b, Appendix D);
- *Updated Storm Drain Demands SunCreek Specific Plan Rancho Cordova, CA* (MacKay & Somps Civil Engineers Inc. 2010a, Appendix Q);
- *Shalako Detention Basin Alternative* (MacKay & Somps Civil Engineers Inc. 2010b, Appendix E);
- *Community Park Detention Basin* (MacKay & Somps Civil Engineers Inc. 2010c, Appendix F);
- *Stand-Alone Detention Basin Alternative* (MacKay & Somps Civil Engineers Inc. 2010d, Appendix G);
- *Sacramento City/County Drainage Manual Volume 2: Hydrology Standards*. County of Sacramento Department of Water Resources, December 1996 (Sacramento County 1996); and
- *Stormwater Quality Design Manual for the Sacramento and South Placer Regions* (SSQP 2007).

Impacts associated with drainage, hydrology, and water quality that could result from construction and operational activities related to buildout of the project were evaluated based on expected construction practice, the materials used, and the locations and duration of the activities. The effects of the proposed development were compared to environmental baseline conditions (i.e., existing conditions) to determine the duration and magnitude of impacts. Impacts associated with the use of the proposed non-potable water system are evaluated in Section 3.16, “Utilities and Service Systems.”

ISSUES NOT EVALUATED FURTHER IN THIS EIR/EIS

Potential Damage from a 200-Year Flood Event—The requirements of SB 5 are not applicable to the SPA for the following reasons: (1) the SPA is not located within an area protected by either on- or off-site levees; (2) the project has been designed such that the 100-year floodplain within the SPA would be contained within the on-site preserve area and would not encroach into developable portions of the SPA; (3) neither the City nor the County have required flood analysis of the SPA above the 100-year event; and (4) the project has been designed to ensure that post-development 100-year runoff is equal to or lower than existing 100-year runoff. Therefore, there would be no impact related to SB 5 requirements for flood protection for a 200-year storm event, and this issue is not evaluated further in this EIR/EIS.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE Permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.9-1 **Potential Temporary, Short-Term Construction-Related Drainage and Water Quality Effects.** *Construction activities during project implementation would involve extensive grading and movement of earth, which would substantially alter on-site drainage patterns and could generate sediment, erosion, and other nonpoint source pollutants in on-site stormwater that could drain to off-site areas and degrade local water quality.*

NP

Under the No Project Alternative, the project would not be developed and no project-related construction disturbances would occur. Therefore, there would **no direct** or **indirect** project-related impacts to drainage patterns or water quality. ***[Lesser]***

NCP, BIM, CS

The No USACE Permit Alternative, Biological Impact Minimization Alternative, or the Conceptual Strategy Alternative would have reduced construction activity as compared to the Proposed Project Alternative and the total number of residential units that would be constructed would be smaller. However, implementation of these alternatives would still include substantial construction activity over approximately 655, 840, and 940 acres, respectively. Under the No USACE Permit Alternative, because project components would be reconfigured to avoid the placement of dredged or fill material into wetlands and other waters of the U.S., approximately 360 fewer acres would be disturbed and developed as compared to the Proposed Project Alternative. Impacts under the Biological Impact Minimization Alternative would also be less than those of the Proposed Project Alternative because an additional approximately 180 acres of land across the SPA would be preserved for biological habitat. Finally, the Conceptual Strategy Alternative would preserve an additional approximately 107 acres more than the Proposed Project Alternative as a conservation area. This would result in fewer acres of development and associated disturbance than the Proposed Project Alternative. However, under all of these alternatives, substantial temporary, construction-related alteration of the existing drainages would still occur, which could result in impacts on water quality within on-site drainage channels and ultimately off-site drainage channels. Temporary, short-term construction-related disturbances at the SPA would have the potential to result in the discharge of polluted and/or contaminated stormwater or sedimentation. Impacts would likely occur at a similar or slightly lower level than under the Proposed Project Alternatives because similar construction activities would occur over a smaller extent of the SPA. Therefore, the **direct** and **indirect** project-related erosion and water quality impacts would be **significant**. ***[Lesser]***

Mitigation Measure 3.9-1: Acquire Appropriate Regulatory Permits and Prepare and Implement an Erosion and Sediment Control Plan, SWPPP, and BMPs.

As required by the Land Grading and Erosion Control Ordinance (Chapter 16.44 of County and City of Rancho Cordova Municipal Codes), projects disturbing 350 cubic yards or more of soil or one or more acres of land shall prepare an erosion and sediment control plan specifying best management practices (BMPs) for erosion and sediment control. This erosion and sediment control plan shall be checked in the field by the City inspector during construction.

Prior to the issuance of grading permits, the project applicants for any particular discretionary development application disturbing one or more acres (including phased construction of smaller areas which are part of the larger project) shall obtain coverage under the SWRCB's NPDES stormwater permit for general construction activity (Order 2009-0009-DWQ), including preparation and submittal of a project-specific storm water pollution prevention plan (SWPPP) at the time the NOI to discharge is filed. The project applicants shall also prepare and submit any other necessary erosion and sediment control and engineering plans and specifications for pollution prevention and control to the City of Rancho Cordova Public Works Department. The SWPPP and other appropriate plans shall identify and specify:

- the use of an effective combination of robust erosion and sediment control BMPs and construction techniques accepted by the City for use in the project area at the time of construction, that shall reduce the potential for runoff and the release, mobilization, and exposure of pollutants, including legacy sources of mercury from project-related construction sites. These may include but would not be limited to temporary erosion control and soil stabilization measures, sedimentation ponds, inlet protection, perforated riser pipes, check dams, and silt fences;

- the implementation of approved local plans, non-stormwater management controls, permanent post-construction BMPs, and inspection and maintenance responsibilities;

- the pollutants that are likely to be used during construction that could be present in stormwater drainage and nonstormwater discharges, including fuels, lubricants, and other types of materials used for equipment operation;

- the means of waste disposal;

- spill prevention and contingency measures, including measures to prevent or clean up spills of hazardous waste and of hazardous materials used for equipment operation, and emergency procedures for responding to spills;

- personnel training requirements and procedures that shall be used to ensure that workers are aware of permit requirements and proper installation methods for BMPs specified in the SWPPP; and

- the appropriate personnel responsible for supervisory duties related to implementation of the SWPPP.

Where applicable, BMPs identified in the SWPPP shall be in place throughout all site work and construction/demolition activities and shall be used in all subsequent site development activities. BMPs may include, but are not limited to, such measures as those listed below.

- Implementing temporary erosion and sediment control measures in disturbed areas to minimize discharge of sediment into nearby drainage conveyances, in compliance with state and local standards in effect at the time of construction. These measures may include silt fences, staked straw bales or wattles, sediment/silt basins and traps, geofabric, sandbag dikes, and temporary vegetation.

- Establishing permanent vegetative cover to reduce erosion in areas disturbed by construction by slowing runoff velocities, trapping sediment, and enhancing filtration and transpiration.

- Using drainage swales, ditches, and earth dikes to control erosion and runoff by conveying surface runoff down sloping land, intercepting and diverting runoff to a watercourse or channel, preventing sheet flow over sloped surfaces, preventing runoff accumulation at the base of a grade, and avoiding flood damage along roadways and facility infrastructure.

A copy of the approved SWPPP shall be maintained and available at all times on the construction site.

Implementation: Project applicants for any particular discretionary development application.

Timing: Submittal of the State Construction General Permit NOI and SWPPP (where applicable) and development and submittal of any other locally required plans and specifications before the issuance of grading permits for each particular discretionary development application and implementation throughout project construction.

Enforcement: City of Rancho Cordova Public Works Department, State Water Resources Control Board, and Central Valley Regional Water Quality Control Board.

PP

Implementation of the Proposed Project Alternative would take place over approximately 1,000 acres. Construction activities associated with the project, including vegetation removal, grading, staging, trenching, and excavation, would expose soils to erosive forces and might transport sediment into local drainages, increasing turbidity, degrading water quality, and resulting in siltation to local waterways. Although the SPA is generally characterized as rolling terrain, the greatest topographic changes occur along the tributaries of Laguna Creek (e.g., Kite Creek), which generally slope from the northeast to the southwest. Localized erosion hazards may be high where the SPA topography is steeper. Intense rainfall and associated stormwater runoff in relatively flat areas could result in short periods of sheet erosion within areas of exposed or stockpiled soils. If uncontrolled, these soil materials could cause sedimentation and blockage of drainage channels. Further, the compaction of soils by heavy equipment may further reduce the infiltration capacity of soils and increase the potential for runoff and erosion.

Non-stormwater discharges could result from activities such as construction dewatering procedures, or discharge or accidental spills of hazardous substances such as fuels, oils, petroleum hydrocarbons, concrete, paints, solvents, cleaners, or other construction materials. This contaminated runoff could enter on-site drainage channels and ultimately drain off-site to downstream waterbodies, including Kite Creek, Laguna Creek, and ultimately the Sacramento River. Erosion and construction-related wastes have the potential to degrade existing water quality and beneficial uses by altering the dissolved oxygen content, temperature, pH, suspended sediment and turbidity levels, or nutrient content, or by causing toxic effects in the aquatic environment. Therefore, project-related construction activities could violate water quality standards or cause direct harm to aquatic organisms.

As described in the Draft SunCreek Specific Plan (2010:I.6-5, attached as Appendix C), nonstructural as well as structural BMPs would be used during construction activities to decrease storm water discharge. The nonstructural measures could include grading controls such as timing, staging, setbacks and buffers, and restrictions on open areas. Nonstructural measures could also include housekeeping techniques involving limitations on material storage and disposal, soil stabilization of all roads and entrances, dust control, and mandatory site cleanup. Because the Proposed Project Alternative would disturb large areas of land, substantially alter on-site drainage patterns, and could result in impacts on water quality within on-site drainage channels and ultimately off-site drainage channels as a result of temporary, short-term construction activities, the **direct** and **indirect** project-related erosion and water quality impacts would be **significant**. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3.9-1.

ID

Implementation of the Increased Development Alternative would include substantial construction activity over approximately 1,170 acres. This alternative would preserve approximately 150 acres less than the Proposed Project Alternative for conservation/wetlands. In addition, the Increased Development Alternative would include a larger number of total dwelling units than the Proposed Project Alternative. Because the Increased Development Alternative would disturb large areas of land, substantially alter on-site drainage patterns, and could result in impacts on water quality within on-site drainage channels and ultimately off-site drainage channels as a result of temporary, short-term construction activities, the **direct** and **indirect** project-related erosion and water quality impacts would be **significant**. ***[Greater]***

Mitigation Measure: Implement Mitigation Measure 3.9-1.

Implementation of Mitigation Measure 3.9-1 would reduce the significant temporary, short-term construction-related drainage and water quality impacts under the No USACE Permit, Proposed Project, Biological Impact

Minimization, Conceptual Strategy, and Increased Development Alternatives to **a less-than-significant level** by requiring preparation and implementation of a SWPPP with appropriate BMPs such as source control, revegetation, and erosion control, to maintain surface water quality conditions in adjacent receiving waters.

Several technical studies have been conducted regarding the impacts of water quality control features on groundwater (e.g., City of Fresno Nationwide Urban Runoff Project [as summarized in EPA 1983] and *California Storm Water Best Management Practices Handbook* prepared by the California Stormwater Quality Association [CASQA] [CASQA 2010]) and surface water (e.g., *Preliminary Data Summary of Urban Storm Water Best Management Practices* [EPA 1999] and *Truckee River Basin Stormwater Management Program, Program Years 2007-2012* [County of Placer 2007]). These studies have identified that water quality control features such as revegetation, erosion control measures detention/sedimentation, and infiltration basins have been successful in controlling water quality and avoiding water quality impacts (metals and organic compounds associated with stormwater are typically lost within the first few feet of the soil of the retention basins associated with groundwater). Further, technical studies associated with the Lahontan Development demonstrated that the use of a variety BMPs such as source control, detention/sedimentation basins, revegetation, and erosion control, have been able to maintain surface water quality conditions in adjacent receiving waters.

IMPACT 3.9-2	**Potential Increased Risk of Flooding and Hydromodification from Increased Stormwater Runoff.** *Project implementation would increase the amount of impervious surfaces on the SPA, thereby increasing surface runoff. This increase in surface runoff would result in an increase in both the total volume and the peak discharge rate of stormwater runoff, and therefore could result in greater potential for on- and off-site flooding.*

NP

Under the No Project Alternative, the existing hydrology and drainage conditions at the SPA would not be altered because no project-related development would occur. Thus, **direct** and **indirect** project-related impacts from increased flooding and hydromodification would be **less than significant**. ***[Lesser]***

NCP, BIM, CS

The amount of stormwater runoff would likely be lower under the No USACE Permit, Biological Impact Minimization, and Conceptual Strategy Alternatives than under the Proposed Project Alternative because of the decreased development areas (approximately 38%, 16%, and 7 % less than the Proposed Project Alternative, respectively) and associated decreases in impervious surfaces of residential and commercial land uses, as shown in Exhibits 2-20 (NCP), 2-22 (BIM), and 2-24 (CS) in Chapter 2, "Alternatives."

To eliminate any flow increase, exceedances of the capacity (peak flow) of existing or planned stormwater drainage systems, or unacceptable hydromodification caused by project development to Kite Creek, stormwater detention facilities and basin outlet control devices would be constructed to maintain peak storm flows at no greater than the level existing before development. However, since final designs, specifications, and modeling for these three alternatives have not been performed, or submitted to or approved by the City, implementation of the No USACE Permit, Biological Impact Minimization, and Conceptual Strategy Alternatives could result in **potentially significant, direct** and **indirect** impacts related to stormwater runoff and the subsequent risk of flooding. ***[Lesser]***

Mitigation Measure 3.9-2: Prepare and Submit Updated Regional Master Drainage Studies and Final Drainage Plans and Implement Requirements Contained in Those Plans.

Before approval of the first large lot tentative subdivision map in the SPA, the project applicants shall:

1. Submit an updated Regional Master Drainage Study for the SPA to the City demonstrating to the satisfaction of the City of Rancho Cordova Public Works Department that:

   - the proposed stormwater detention basins are appropriately sized in compliance with the SSQP's NPDES Permit and the draft Hydromodification Management Plan (as finally adopted by the Central Valley RWQCB) so that hydromodification would not increase from predevelopment levels enough to alter existing stream geomorphology. Drainage improvements shall be designed to address hydromodification impacts caused by development using methods approved by the SSQP and/or City of Rancho Cordova Public Works Department;

   - the stormwater detention basins will drain by gravity;

   - the stormwater detention basins can be designed to minimize long-term maintenance, especially as it relates to the basin outlet structures; and

   - the depth and duration of the existing flooding problem at the Sunrise Boulevard crossing of Laguna Creek is not substantially increased by project development.

2. Prepare and submit a Conditional Letters of Map Revision (CLOMR) to FEMA showing the existing 100-year (0.01 AEP) floodplain for the existing site (existing conditions).

Furthermore, before the approval of grading plans, site improvements, and/or building permits, the project applicants for any particular discretionary development application shall obtain an approved CLOMR from FEMA and submit a final construction level drainage study and plans to the City demonstrating that project-related on-site runoff would be appropriately contained in detention basins or managed with other improvement s (e.g., source controls using LID techniques) to maintain peak storm flows at no greater than the level existing before development and to accommodate flows based on a 100-year storm event, as required by the Sacramento County Flood Control Ordinance.

The drainage study and plans shall include all the items required for tentative map level study. In addition, the drainage study and plans shall include, but not be limited to, the following items:

- an accurate calculation of pre-project and post-project runoff for the final design scenario, obtained using appropriate engineering methods, that accurately evaluates potential changes to runoff, including increased surface runoff;

- runoff calculations for the 10-year and 100-year (0.01 AEP) storm events (and other, smaller storm events as required) shall be performed and the trunk drainage pipeline sizes confirmed based on alignments and finalized detention facility locations;

- a description of the proposed maintenance program for the on-site drainage system; and

- City flood control design requirements and measures designed to comply with them.

Implementation of stormwater management BMPs that avoid increases in the erosive force of flows beyond a specific range of conditions shall limit hydromodification and maintain current stream geomorphology. BMPs may include, but are not limited to, the use of LID techniques to limit increases in stormwater runoff at the point of origination (these may include, but are not limited to: surface swales; replacement of conventional impervious surfaces with pervious surfaces [e.g., porous pavement]; impervious surfaces disconnection; and trees planted to intercept stormwater). These BMPs may be designed and constructed in accordance with the forthcoming SSQP Hydromodification Management Plan (to be adopted by the Central Valley RWQCB), as appropriate.

The final drainage plan shall demonstrate to the satisfaction of the City of Rancho Cordova Community Development and Public Works Departments that 100-year (0.01 AEP) flood flows would be appropriately channeled and contained, such that the risk to people or damage to structures within or down gradient of the SPA would not occur, and that hydromodification would not be increased from pre-development levels such that existing stream geomorphology would be changed. The range of conditions should be calculated for each receiving water (if feasible), as approved by the SSQP and/or City of Rancho Cordova Public Works Department).

Implementation: Project applicants during each particular discretionary development phase.

Timing: Before approval of grading plans and building permits of all project phases.

Enforcement: City of Rancho Cordova Public Works Department.

PP

Project implementation would include development on approximately 863 acres of land, most of which has not been previously developed. The Proposed Project Alternative includes residential and commercial development, and supporting facilities and services, including parks, schools, and major circulation and roadway infrastructure. The various types of proposed land uses would each contribute different relative amounts of stormwater runoff corresponding to the percentage of impervious surface associated with each land use category, which ranges from 2% (wetlands/open space) to 95% (major roads, parking, and stormwater detention) (County of Sacramento Department of Water Resources 1996:5-7). This increase in impervious surface would increase the peak discharge rate of stormwater runoff generated on the SPA.

A Regional Master Drainage Study (RMDS) has been prepared that details the proposed drainage system (MacKay & Somps 2011b) and includes modeling of additional drainage alternatives. The proposed stormwater drainage system has been designed to satisfy the design criteria of the SSQP, FEMA National Flood Insurance Program requirements, and the NPDES requirements. The Proposed Project Alternative would use an on-site conveyance and detention/water quality treatment system and the conveyance of off-site flows through the property as described in detail in Chapter 2, “Alternatives.”

The hydrologic analysis in the RMDS is based on procedures outlined in the Sacramento City/County Drainage Manual, Volume 2 Hydrology Standards (County of Sacramento Department of Water Resources 1996), the County of Sacramento Municipal Services Agency Improvement Standards (County of Sacramento 2006), and the Floodplain Management Ordinance (County of Sacramento 2007). The USACE HEC-RAS program (version 3.1.3) was used to model the Proposed Project Alternative using the unsteady state routines to determine the peak flow and hydraulic grade line for the 10-year 24-hour, 100-year 24-hour, and 100-year 10-day design storms. The 100-year, 10-day storm was found to generate larger detention volume and therefore, all detention basins were sized based on the 100-year, 10-day storm (see Table 3.9-5). The following three scenarios were modeled:

1. **Existing Conditions:** This scenario establishes existing base flow conditions without project development. The only developed land within the SunCreek Drainage Study Area is a 200-acre subdivision known as Anatolia III. The remainder of the watershed is modeled as undeveloped land. (This scenario is the “CEQA baseline” condition.)

2. **Developed Condition**: This scenario is based on a fully developed SPA, utilizing the Existing Conditions model as a starting point and adding in the SunCreek land use plan without peak flow attenuation. The Anatolia III development was modeled the same as in the Existing Conditions scenario (developed) and the remainder of the watershed was also modeled the same as Existing Conditions (undeveloped).

3. **“Baseline” Conditions:** This scenario includes the fully developed SPA with water quality and detention basins sized so that the post-project flow rates and durations do not exceed the pre-project conditions flow rates (i.e., with peak flow attenuation). The Anatolia III development was modeled the same as in the Existing Conditions scenario (developed) and the remainder of the watershed was also modeled the same as Existing Conditions (undeveloped). This modeling scenario is not the “CEQA baseline”; rather, it serves as the necessary starting point for modeling of additional hydrologic alternatives where the SPA is fully developed and flow rates are attenuated, so that the effects of existing and projected development adjacent to the project site can be studied in various ways and the most effective on-site hydrologic solutions (with peak flow attenuation) can be determined.

There are two upstream undeveloped off-site areas that drain into the SPA, one of which is a portion of The Ranch at Sunridge project located north of North Campus Drive, and the other is the Anatolia III project, located at the southeast corner of Rancho Cordova Parkway and Kiefer Boulevard. The RMDS assumes that these two upstream off-site areas are developed and they are therefore included in the sizing of the downstream SPA extended duration detention basin.

As described in Section 3.9.1, “Affected Environment,” the Morrison Creek Watershed is located north of the Laguna Creek Watershed. A portion of the runoff from the 100-year, 24-hour storm occurring in the Morrison Creek Watershed has been found to spill (“Morrison Spill”) into the Laguna Creek Watershed. The Morrison Spill occurs within an open space preserve area located north of Kiefer Boulevard and east of Sunrise Boulevard and traverses through the open space preserve, cross’s under Kiefer Boulevard, continues through the SPA and eventually connects to Kite Creek. To minimize the impact to the SPA, the Morrison Spill would be intercepted at the Kiefer Boulevard culverts and routed around the SPA. The 72-inch diameter pipeline used to accomplish the rerouting of the Morrison Spill was sized to convey the higher peak flow of 243 +/- cubic feet per second (cfs) generated by the 100-year, 10-day storm rather than the peak flow rate of 127 +/- cfs generated by the 100-year, 24-hour storm. The velocity energy would be dissipated in the new outlet structure before the flow enters the preserve/open space area and Kite Creek. Since the Morrison Spill originates from the adjacent Morrison Creek Watershed through existing water quality and detention basins, the SunCreek RMDS treats the Morrison Spill as an existing condition flow that does not require additional water quality treatment or detention within the SPA and will be designed for stormwater quality management and hydromodification management per the SSQP’s draft Hydromodification Management Plan and the Stormwater Quality Design Manual.

Ten principles are described in the SunCreek Specific Plan to protect and manage the proposed preserve area within the SPA. Principle 3 sets the standard to “manage stormwater flows to minimize changes to the existing flow regime and to maintain or improve existing water quality in the Preserve Areas, including minimizing changes to the baseline flows in receiving waters to the extent practicable and not allowing untreated discharges to occur to the aquatic resources in the Preserve Areas” (Draft SunCreek Specific Plan:6-4, Appendix C). To meet this standard, multiple detention basins would be distributed throughout the SPA.

County guidelines require that peak storm water flows (measured at the edge of a project) after development of the SPA (post development) not exceed predevelopment peak flows. Peak runoff flows and volumes would increase in the SPA as a result of the planned development. As illustrated in Exhibit 2-5 (see Chapter 2, “Alternatives”) and McKay & Somps 2011b, the Proposed Project Alternative includes facilities that are designed to maintain stormwater flows originating on the SPA during and after buildout, at a level equal to or less than predevelopment flows. It should be noted that existing flooding currently occurs along Laguna Creek at Jackson Highway and Sunrise Boulevard, to the south of the southwestern corner of the SPA. The Proposed Project Alternative would not contribute to additional flooding at this location. On-site extended duration detention basins would be constructed as part of the project. The extended duration detention basins would reduce the developed storm runoff rates for the 10-year, 24-hour storm and the 100-year, 24-hour storms in the SPA to less than the predevelopment storm runoff rates (MacKay & Somps 2011b:44).

Summer nuisance flows have become an area of concern for the County of Sacramento. Summer nuisance flows occur during the dry (summer) season and are mostly generated from residential developments by over irrigation of landscaping, washing of vehicles, and other domestic uses that results in water running off of the development. Ephemeral tributaries that did not typically receive water runoff during the summer could become a perennial tributary due to summer nuisance flows. The County of Sacramento and the USACE require that an existing ephemeral tributary not become a perennial tributary after development occurs in the watershed. The RMDS has addressed the impacts of summer nuisance flows by designing percolation trenches into the detention basins. Summer nuisance flows that exceed the evaporation rate and percolation rate of the wet-water quality basin would be percolated into the ground through specially designed and constructed percolation trenches placed in the bottom of the extended duration detention basin. The percolation trenches would be sized to percolate 100% of the summer nuisance flows. Calculations completed in the RMDS show that the typical proposed detention basins can reduce the summer nuisance flow to a level that would not result in the conversion of existing ephemeral tributaries to perennial tributaries (MacKay & Somps 2011b:16).

In addition to the use of extended duration detention basins, BMPs would be used within the developed areas, such as vegetated swales, infiltration trenches, and constructed wetland filter strips, to manage and treat storm water. Detention in parking areas, streets, paseos, and pedestrian corridors in the form of swales and small basins would also be provided. The primary existing drainage corridor (Kite Creek) would also remain in place because this portion of the SPA would remain in permanent open space and would continue to provide natural storage capacity.

Modeling results of peak flows at 13 compliance point locations under the Proposed Project Alternative were compared for the 10-year and 100-year (0.01 AEP), 24-hour storm events, as shown in Table 3.9-4. The results in Table 3.9-4 show that the modeled developed conditions scenario, with a fully developed SPA and without peak flow attenuation, would generate peak flow storm runoff rates well above the modeled existing conditions peak flow storm runoff rates. The results presented in Table 3.9-4 also show that with the detention basin facilities as proposed, the 100-year (0.01 AEP) and 10-year storm events under the Proposed Project Alternative development conditions ("Baseline" Conditions) would remain at or below existing conditions. In one case (Compliance Point 12 under the 10-year, 24-hour scenario), a small increase in peak flow rates was identified in the modeling results. This difference is not significant since it was modeled as a "steady state" condition in SacCalc and not as an "unsteady state" condition in HEC-RAS where the effects of attenuation would be considered at a detailed level. HEC-RAS modeling was not possible on this stream at this stage in the design process. It is the professional judgment of the engineers who modeled this stream (MacKay & Somps) that this difference will be eliminated when this stream is modeled HEC-RAS during final design. Modified outlet facilities would be provided to reduce the flow to pre-project conditions if it is determined during detailed design studies (submitted with small-lot tentative subdivision maps and/or improvement plans) that downstream facilities would be affected. Table 3.9-5 summarizes the detention basin storage volumes and maximum detention basin discharge rates for each of the 12 proposed detention basins that would be required to maintain existing flow rates after project development. The proposed locations of the 12 detention basins are shown on Exhibits 2-4 and 2-5 in Chapter 2, "Alternatives."

An analysis was conducted in 2010 to update the storm drain demands to incorporate the minor land use changes that have occurred in the SunCreek Specific Plan. These changes in land use principally relate to the addition of more employment-related (commercial) land uses in place of low density, medium density and compact density residential land uses. The total impervious area of the current land use plan is slightly less than that of the prior land use plan and therefore the findings of the RMDS are slightly conservative, as the analysis was based on the prior land use plan (McKay & Somps 2011b:10). A review of updated land use plans was conducted by McKay & Somps to determine the continued adequacy of the RMDS evaluation. The results of this study indicated that total storm drain demands are nearly identical to those analyzed in the RMDS and therefore, it is reasonable to conclude that the size, location, and general approach for stormwater management provided in the RMDS are still adequate (McKay & Somps 2011b:Appendix H). A comparison of the storm drain demands resulting from the prior and updated land use plans is shown in Table 3.9-6. The 1.5% increase in cumulative projected storm drain demands, based on land use changes, would result in insignificant adjustments to the peak flow and hydromodification requirements and any adjustments to basins would be able to be contained within the developable footprint.

Table 3.9-4
Modeled Peak Flow Results at Project Compliance Point Locations

Compliance Point	Creek Section Station	Existing Conditions 10-Year, 24-hour Peak Flow Rate (cfs)	Developed Conditions 10-Year, 24-hour Peak Flow Rate (cfs)	"Baseline" Conditions 10-Year, 24-hour Peak Flow Rate[1] (cfs)	Existing Conditions 100-Year, 24-hour Peak Flow Rate (cfs)	Developed Conditions 100-Year, 24-hour Peak Flow Rate (cfs)	"Baseline" Conditions 100-Year, 24-hour Peak Flow Rate[1] (cfs)
1	0+00	1,025	1,292	N/A	1,801	2,076	1,737
2	36+00	1,036	1,306	N/A	1,810	2,086	1,740
3	70+00	989	1,244	N/A	1,741	1,957	1,632
4	76+19	848	1,040	808	1,501	1,607	1,354
5	80+95	848	1,045	809	1,504	1,607	1,354
6	82+00	849	1,048	811	1,508	1,607	1,354
7	112+05	826	1,050	763	1,518	1,773	1,321
8	152+00	402	700	372	669	1,155	631
9	61+45	N/A	N/A	N/A	127	127	127
10	184+50	386	600	293	635	994	512
11	212+00	332	499	216	591	835	347
12		157	161	161[2]	271	266	266
13		138	138	138	234	234	234

Note: cfs = cubic feet per second; N/A = not applicable

1 "Baseline" Conditions peak flows include the rerouting of the Morrison Spill through the proposed 72-inch-diameter pipeline in Kiefer Boulevard.

2 Modeled "Baseline" Conditions peak flows are greater than Existing Conditions peak flows. This is a reasonable conclusion since this modeling was performed as a "steady state" condition in SacCalc and not as an "unsteady state" condition in HEC-RAS. Therefore, it is the professional judgment of the engineers who modeled this stream (MacKay & Somps) that this higher peak flow rate will be eliminated when this configuration of detention basins is modeled HEC-RAS during final design.

Source: MacKay & Somps 2011b:20, 22, 26.

Table 3.9-5 Modeled Peak "Baseline" Conditions Storm Detention Capacity and Flow Rate				
Detention Basin Number	**"Baseline" Conditions 10-Year, 24-Hour Maximum Discharge Flow Rate (cfs)**	**"Baseline" Conditions 100-Year, 24-Hour Maximum Discharge Flow Rate (cfs)**	**"Baseline" Conditions 10-Year, 24-Hour Detention Basin Volume (acre-feet)**	**"Baseline" Conditions 100-Year, 10-Day Detention Basin Volume (acre-feet)[1]**
1	26	34	4.6	6.7[2]
2	17	24	13.8	21.6
3	5	7	11.5	21.3
4	14	23	18.8	28.4
5	20	27	27.7	42.0
6	13	17	14.1	21.8
7	11	14	6.6	9.2[2]
8	16	22	16.9	26.6
9	9	12	10.9	16.8
10	13	17	6.3	9.2[2]
11	5	7	1.1	1.7[2]
12	16	20	11.5	16.6

Notes: cfs = cubic feet per second

1 The 100-year, 10-day storm generated larger detention volumes and therefore, the detention basins are sized based on the 100-year, 10-day storm.

2 Denotes that the volume and water surface are controlled by the 100-year, 24-hour storm.

Source: MacKay & Somps 2011b:27, 28.

Table 3.9-6 Comparison of Drainage Demands				
Storm Drain Demands	**Prior land Use Plan Water Quality Flow (cfs)**	**Updated Land Use Plan Water Quality Flow (cfs)**	**Change**	**Percent Change**
Developed Acreage	997.0	964.6	-32.1	-3.2%
Cumulative Water Quality Flow	90.5	91.9	1.4	1.5%

Notes: cfs = cubic feet per second

1 The 100-year, 10-day storm generated larger detention volumes and therefore, the detention basins are sized based on the 100-year, 10-day storm.

Source: MacKay & Somps 2011b:Appendix H.

FEMA has not mapped the flood plain within the SPA. However, the County of Sacramento and the RMDS both have identified an existing a 100-year floodplain within the preserve area, as shown in Exhibit 3.9-2. The City of Rancho Cordova will require the mapping of this flood plain per FEMA requirements prior to approval of the first large lot map.

Anatolia III Modeling Alternatives

As requested by the City of Rancho Cordova and the County of Sacramento, four drainage scenario alternatives (Anatolia III Alternatives A though D) were modeled in the RMDS (McKay & Somps 2011b:29-37). These alternatives would remove the interim drainage improvements to different degrees from the Anatolia III project and incorporate them into the drainage infrastructure improvements within the SPA. Alterations to Kite Creek and on-site detention developed as part of the Anatolia III project are described above in Section 3.9.1, "Affected Environment."

The hydrologic analysis of the Anatolia III drainage modeling alternatives used the same procedures described above for the Existing, Developed, and "Baseline" Conditions scenarios. The following four alternative scenarios were modeled (see additional information about each Anatolia III alternative in Chapter 2, "Alternatives").

1. **Anatolia III Alternative A:** This alternative uses the "Baseline" Conditions model as a starting point and removes the existing Anatolia III detention basin from the model, resulting in the need to increase the size of the SPA detention basin volumes. This alternative results in the loss of 6.78 acres of development area in the SPA as compared to the project without the Anatolia III alternative, but allows the Anatolia III Project to reclaim 29 single family lots.

2. **Anatolia III Alternative B:** This alternative uses the Anatolia III Alternative A model as a starting point and relocates a portion of the existing on-site Anatolia III channel to the southern right-of-way of Kiefer Boulevard. This alternative results in the loss of 10.38 acres of development area in the SPA as compared to the project without the Anatolia III alternative, but allows the Anatolia III project to reclaim 42 single family lots.

3. **Anatolia III Alternative C:** This alternative uses the Anatolia III Alternative A model as a starting point and removes both the existing on-site Anatolia III detention basin and channel completely from the development. This alternative results in the loss of 12.08 acres of development area in the SPA as compared to the project without the Anatolia III alternative, and 1.10 acres of developable area in the Arboretum project site, but allows the Anatolia III project to reclaim 42 single family lots.

4. **Anatolia III Alternative D:** This alternative uses the "Baseline" Conditions model with Anatolia III Alternative C as a starting point and replaces the Anatolia III channel with twin 72-inch culverts. This alternative results in the loss of 6.78 acres of development area in the SPA as compared to the project without the Anatolia III alternative, but allows the Anatolia III project to reclaim 42 single family lots.

In order to accommodate the relocation of the detention basin and/or channel infrastructure from the Anatolia III development to the SPA, larger detention basins and new box culverts would be required within the SPA and there would be a loss of developable area in the SPA to accommodate those changes. However, the planned on-site detention basins were sized such that the flow rates exiting the SunCreek project boundaries would not exceed the existing conditions flow rates even with the addition of the Anatolia III flows (MacKay & Somps 2011b:23). The peak flow rates from 100-year (0.01 AEP) and 10-year storm events under all of these Anatolia III alternatives would remain at or below existing conditions, as shown in Table 3.9-7. (As previously stated, compliance Point 12 in Table 3.9-7 shows slightly higher post development flows than existing conditions. This difference is not significant since it was modeled as a "steady state" condition in SacCalc and not as an "unsteady state" condition in HEC-RAS where the effects of attenuation in Detention Basin No. 1 would be considered. SacCalc results are known to be "conservative" when compared to HEC-RAS results. HEC-RAS modeling was not possible on this stream at this stage in the planning process. It is the professional judgment of the engineers who modeled this stream (MacKay & Somps) that this difference will be eliminated when this stream is modeled HEC-RAS during final design.)

Table 3.9-7
Modeled Peak Flow Results at Project Compliance Point Locations for Anatolia III Alternatives

Compliance Point	Creek Section Station	Existing Conditions	"Baseline" Conditions[1]	Alternative A[1]	Alternative B[1]	Alternative C[1]	Alternative D[1]
10-Year, 24-hour Peak Flow Rate (cfs)							
1	0+00	1,025	N/A	N/A	N/A	N/A	N/A
2	36+00	1,036	N/A	N/A	N/A	N/A	N/A
3	70+00	989	N/A	N/A	N/A	N/A	N/A
4	76+19	848	808	773	740	776	773
5	80+95	848	809	774	741	777	774
6	82+00	849	811	779	744	782	781
7	112+05	826	763	727	699	734	728
8	152+00	402	372	374	372	376	388
9	61+45	N/A	N/A	N/A	N/A	N/A	N/A
10	184+50	386	293	317	319	316	135
11	212+00	332	216	186	183	187	182
12		157	161[2]	161[2]	161[2]	161[2]	161[2]
13		138	138	138	138	138	138
100-Year, 24-hour Peak Flow Rate (cfs)							
1	0+00	1,801	1,737	1,702	1,688	1,675	1,685
2	36+00	1,810	1,740	1,707	1,692	1,677	1,689
3	70+00	1,741	1,632	1,575	1,568	1,574	1,564
4	76+19	1,501	1,354	1,247	1,252	1,320	1,240
5	80+95	1,504	1,354	1,281	1,271	1,320	1,272
6	82+00	1,508	1,354	1,283	1,276	1,320	1,277
7	112+05	1,518	1,321	1,266	1,263	1,312	1,259
8	152+00	669	631	631	627	525	620
9	61+45	127	127	127	127	127	127
10	184+50	635	512	543	544	407	292
11	212+00	591	347	310	309	304	292
12		271	266	266	266	266	266
13		234	234	234	234	234	234

Note: cfs = cubic feet per second; N/A = not applicable

1 "Baseline" Conditions as well as all alternative peak flows include the rerouting of the Morrison Spill through the proposed 72-inch-diameter pipeline in Kiefer Boulevard.

2 Modeled peak flows are greater than Existing Conditions peak flows. This is a reasonable conclusion since this modeling was performed as a "steady state" condition in SacCalc and not as an "unsteady state" condition in HEC-RAS. SacCalc results are known to be "conservative" when compared to HEC-RAS results. Therefore, it is the professional judgment of the engineers who modeled this stream (MacKay & Somps) that this higher peak flow rate will be eliminated when this configuration of detention basins is modeled HEC-RAS during final design.

Source: MacKay & Somps 2011b:31, 34, 35, 37.

Detention Basin Alternatives

Several additional detention basin alternatives were considered to address various drainage issues, as described in technical memoranda prepared by MacKay & Somps: the Shalako Detention Basin Alternative (MacKay & Somps 2010a, attached as Appendix E), the Community Park Detention Basin Alternative (MacKay & Somps 2010b, attached as Appendix F), and the Stand-Alone Detention Basin Alternative (MacKay & Somps 2010c, attached as Appendix G) (see additional details in Chapter 2, "Alternatives").

Shalako Detention Basin Alternative. The Shalako property is located at the southwestern corner of the SPA, adjacent to the Arboretum project site. In order to provide that runoff from the developed portions of the SPA does not enter the on-site preserve, several feet of fill dirt would need to be placed along the southernmost tier of lots within the Shalako property. The resulting lot pad elevations would be approximately 2-6 feet higher than the adjoining tier of lots on the Arboretum project site. The difference in elevations would create a substantial slope between adjoining lots, requiring either the construction of expensive retaining walls or requiring excessive lot depths. An alternative design solution was analyzed to determine if an acceptable grading solution could be along the common project boundary while still being able capture, treat, and attenuate the Shalako property storm runoff. This alternative analysis consisted of the following components:

1. Quantify the stand-alone hydromodification flow duration control volume requirements for basin no. 12 and separate from the total detention volume of the basin.

2. Reduce the size of basin no. 12 to allow the overland flow release from the southwestern portion of the Shalako property to pass through the basin unattenuated and discharge directly into Kite Creek while retaining the requisite water quality and hydromodification volumes.

3. Increase the flood control volumes in basins 9, 10, and 11 on an incremental basis until the hydraulic model reflects a "no net change" condition.

4. Compare the magnitude of the flows to demonstrate a "no net change" condition.

The analysis performed by MacKay & Somps (2010a:7) demonstrated that it is technically feasible to eliminate and/or minimize the grading interface problem through redistribution of the flood storage volume from detention basin no. 12 to basins Nos. 9, 10, and 11. The results of this analysis are presented in Table 3.9-8. This analysis was also able to confirm that this detention basin alternative would result in a "no net change" condition in the 100-year, 24-hour flow at the compliance point. As compared to the "Baseline" Conditions scenario, the Shalako Detention Basin Alternative would have a slightly decreased flow (613 vs. 617 cfs) at the compliance point located in Kite Creek at the southern boundary of the Shalako property for the 10-year event and a slightly increased flow (1,034 vs. 1,024 cfs) at the compliance point for the 100-year event. This is a reasonable conclusion since this modeling was performed as a "steady state" condition in SacCalc and not as an "unsteady state" condition in HEC-RAS where the effects of attenuation in detention basin nos. 9, 10, and 11 would be considered. SacCalc results are known to be "conservative" when compared to HEC-RAS results. Therefore, it is the professional judgment of the engineers who modeled this stream (MacKay & Somps) that this difference (1,034 vs. 1,024 cfs) will be eliminated when this configuration of detention basins is modeled HEC-RAS during final design. Therefore, the flood control basins could feasibly be reconfigured without an increase in peak flows from the 100-year (0.01 AEP) and 10-year storm events at the compliance point. Reconfiguring the detention basins would reduce the building pad elevations along the southernmost tier of lots within the Shalako property by approximately 1 to 3 feet; this would effectively eliminate the grading interface problem between the SPA and the Arboretum project site.

Community Park Detention Basin Alternative. As an alternative to encumbering the community park site with a large detention basin that does not provide any other uses for a majority of the year, the Community Park Detention Basin Alternative design was prepared for detention basin no. 5. This alternative design allows for the portion of the detention basin that is above the 10-year, 24-hour, hydromodification water surface elevation to

Table 3.9-8
Comparison of Detention Basin Volumes for the Shalako Detention Basin Alternative

Basin Number	"Baseline" Conditions			Shalako Detention Basin Alternative		
	1.5-Foot Hydro-Modification Storage Volume (AF)	"Baseline" Conditions Model 100-Year Storage Volume (AF)	Total Storage Volume (AF)	1.5-Foot Hydro-Modification Storage Volume (AF)	"Baseline" Conditions Model 100-Year Storage Volume (AF)	Total Storage Volume (AF)
9	3.0	14.0	17.0	3.0	26.0	5.5
10	1.5	10.1	11.5	1.5	20.0	215
11	0.2	1.0	1.2	0.2	2.3	2.5
12	3.5	13.0	16.5	3.5	0	8.2
Total	8.1	38.8	46.1	8.1	48.3	46.1

Notes: AF = acre-feet
Source: MacKay & Somps 2010a:5, 6.

have joint use capabilities so it can function as both a detention basin and a community park. This alternative analysis consisted of the following components:

1. Prepare a revised schematic layout and design of the community park and detention basin no. 5. Grading was adjusted so that (1) overland runoff from development would flow only into the detention basin and not into the on-site preserve, and (2) only the turf play fields would be inundated with runoff during a 100-year, 10-day storm event.

2. Prepare area-elevation curves for incorporation into the SacCalc model. The permanent water quality basin would retain summertime irrigation runoff. In order to maintain the health of aquatic plants and species in the basin, a minimum of depth of 4 feet is desirable; therefore, the basin would be lined to prevent loss of water through infiltration. The basin outlet structure would be set at 7 feet above the basin water, with an outflow and pipeline that connects to the associated hydromodification basin.

3. Run the SacCalc model and determine how much of the park is inundated with runoff and how long the inundation would last.

4. Determine how much park credit would be provided if the community park/detention basin no. 5 were used as a joint-use facility.

Table 3.9-9 shows the results of the SacCalc analysis, indicating that detention basin no. 5 can be designed as a joint use facility while not exceeding the Cordova Recreation & Park District (CRPD) requirements of maximum turf area inundation duration of 72 hours (MacKay & Somps 2010b). Therefore, the Community Park Detention Basin Alternative would satisfy the significance criteria that the flow rates from 100-year (0.01 AEP) storm events remain at or below pre-development flow conditions such that the downstream creek system would not experience an increase in flows over existing conditions.

Table 3.9-9
Duration of Community Park Inundation

Water Surface Elevation	Hours Water is Above Elevation (100-year, 24-hour Storm)	Hours Water is Above Elevation (100-year, 10-day storm)
162.5	0	2
162.0	0	6
161.0	3	10
160.0	10	22
159.0	14	52

Source: MacKay & Somps 2010b

Stand-Alone Detention Basin Alternative. The Stand-Alone Detention Basin Alternative analysis evaluated a scenario where the off-stream portions of the three upstream subwatersheds that extend partially off the SPA were to address their own peak flow, hydromodification, and water quality impacts within their own developments instead of within the SunCreek basins (on-site detention basins nos. 3, 5, and 9) (MacKay & Somps 2010c). In other words, to determine appropriate revisions to the size of on-site detention basins 3, 5, and 9 without the flows from the respective three off-site development areas. This alternative analysis consisted of the following components:

1. Prepare a revised watershed map that created three additional sub-watersheds for the off-site areas, and connect these areas to the SPA open-space preserve with a dedicated pipe sized to convey undeveloped flows (thereby passing the upstream off-site runoff through the SPA).

2. Revise the “Baseline” Conditions model to determine on-site basin sizes if the SPA were developed as a stand-alone project that provided water quality treatment, summertime nuisance retention, and peak flow attenuation for only that portion of the development within the SPA boundary.

3. Determine the proportionate share of the three detention basin sizes that would be due to the three off-site subswatersheds.

The modeling results indicate that the Stand-Alone Detention Basin Alternative would be technically feasible. Table 3.9-10 shows the reduction in sizes of detention basins 3, 5, and 9 under this alternative, as well as the percentage of each basin under “Baseline Conditions” that would be attributable to the runoff from the off-site watershed areas. The Stand-Alone Detention Basin Alternative would continue to maintain the stormwater runoff rates from development in the SPA to levels that would be less than the predevelopment stormwater runoff rates at the SPA boundary (MacKay & Somps 2010c).

Table 3.9-10
Comparison of Hydromodification Basin Volumes for the Stand-Alone Detention Basin Alternative

Basin Number		Stand-Alone Detention Basin Alternative (AF)	“Baseline” Conditions (AF)	Off-site Shed Area’s Percent Share of Baseline
3	Shed Area (Acres)	56.0	76.9	27.2
	Water Quality	1.6	2.2	27.3
	Summertime Nuisance Flow (per day)	0.09	0.12	25.0
	10-Year, 24-Hour Storm	4.7	11.5	59.1
	100-Year, 10-Day Storm	9.6	21.3	54.9
5	Shed Area (Acres)	144.0	201.3	28.5
	Water Quality	4.1	5.7	28.1
	Summertime Nuisance Flow (per day)	0.22	0.31	29.0
	10-Year, 24-Hour Storm	11.4	27.7	58.8
	100-Year, 10-Day Storm	22.7	42.0	46.0
9	Shed Area (Acres)	54.0	82.2	34.3
	Water Quality	1.5	2.3	34.8
	Summertime Nuisance Flow (per day)	0.08	0.13	38.5
	10-Year, 24-Hour Storm	4.0	10.9	63.3
	100-Year, 10-Day Storm	7.7	16.8	54.2

Notes: AF = acre-feet
Source: MacKay & Somps 2010c:3.

Hydromodification

Potential changes to the hydrologic and geomorphic processes in a watershed as a result of impervious surfaces and drainage infrastructure from urbanization include increased runoff volumes and dry weather flows, increased frequency and number of runoff events, increased long-term cumulative duration of flows, as well as increased peak flows. These changes are referred to as "hydromodification." Hydromodification intensifies the erosion and sediment transport process, and often leads to changes in stream channel geometry, and streambed and streambank properties, which can result in degradation and loss of riparian habitat, and downgradient sediment deposition causing flooding problems. Studies have preliminarily evaluated the hydrologic and geomorphic impacts of hydromodification on Kite Creek, as described above in Section 3.9.1, "Affected Environment – Geomorphology" (cbec inc 2008 [Appendix A within DEIR/DEIS Appendix D]).

One measurement used to evaluate the amounts of hydromodification in pre- and post-development scenarios is the erosion potential. While the index of *work* measures the amount of force applied to a channel and the sediment transport capacity at a given flow rate (generally measured in foot-pound-force per square foot), the *erosion potential index* measures the relative change in the amount of erosive force applied to the channel boundary (*work*) done by flows from a watershed that undergoes a change in land use or impervious surface (e.g., the relative change between existing conditions and Baseline Conditions). An erosion potential of 1 would indicate no change in erosion potential due to hydromodification between two watershed scenarios. A study based on 45 stream channel sites in three San Francisco Bay Area watersheds showed that as the erosion potential begins to exceed 1.2 (i.e., a 20 % increase) the probability of stream channel instabilities dramatically increases (Santa Clara Valley Urban Runoff Pollution Prevention Program [SCVURPPP] 2005:3-17). A USACE study suggests a more conservative erosion potential target of 1 ±10% (Geosyntec 2007:5-13).

Based on the guidance provided by Geosyntec in their report for the Laguna Creek Watershed (Geosyntec 2007:5-14), the target index of 1 ± 20% was used in the analysis for the Proposed Project Alternative. The cbec study results indicated that both the upper and lower reaches of Kite Creek would be geomorphologically susceptible to future development unless hydromodification management techniques are used. As shown in Table 3.9-11, implementation of the Proposed Project Alternative without detention basins would result in erosion potentials above the 1.2 target at the two compliance points analyzed. In addition, the use of traditional stormwater detention methods were found to be unsatisfactory in managing hydromodification, and therefore flow duration control would be required to maintain or reduce flow duration and total "work" (as defined in the preceding paragraph) done on the creek (cbec inc 2008:22).

Table 3.9-11
Total Work Done[1] and Erosion Potential Ratios at Compliance Points

Model Scenario	Total Work Done (ft-lbf/ft^2)		Erosion Potential Index	
	Compliances Point #12	Compliances Point #8	Compliances Point #12	Compliances Point #8
Existing Conditions	32,372	22,068	-	-
Baseline Conditions Without Detention[2]	49,571	31,178	1.53	1.41
Baseline Conditions With Detention[3]	33,630	20,823	1.04	0.94

Notes: ft-lbf/ft^2 = foot pound-force per square foot (total work done)
[1] *Work* measures the amount of force applied to a channel and the sediment transport capacity at a given flow rate.
[2] "Baseline" Conditions, but assumes no flood control detention basins (i.e., Developed Conditions).
[3] "Baseline" Conditions with flood control detention basins modified for flow duration control.
Source: cbec inc 2008:Table 5.

Three approaches are typically used to manage the impacts of hydromodification: flow controls to control the discharge rate into receiving waters, LID techniques to infiltrate excess runoff, and in-stream approaches to restore and stabilize streams. Due to USACE-required limitations on construction in the wetland preserve areas, in-stream approaches cannot be used. The impacts on Kite Creek due to hydromodification from project development would be reduced by increasing the extended duration detention basin volume and by slowly metering out storm runoff from detention basins to match undeveloped runoff rates for storms ranging from 25% of the 2-year storm up to and including the 10-year storm using a flow duration control strategy. Energy dissipation structures would be constructed where the detention basins discharge to the open space preserve to reestablish the storm runoff to sheet flow and minimize erosion potential. (See Exhibits 2-6 and 2-7 in Chapter 2, "Alternatives" and Appendix D:14-16 for details.)

Modified Hydromodification Basins Modeling Alternatives

Two hydromodification modeling scenarios were evaluated in the RMDS to assess the minor land use changes that have occurred in the SunCreek Specific Plan and how they would affect peak flow rates within Kite Creek. The Modified Hydromodification Basin Alternative "A" Model used the Baseline Conditions Model as a starting point and revised it to add 30% more detention basin volume to each of the Baseline Conditions 10-year, 24-hour storm detention basins to conservatively evaluate the increase in detention volume required to achieve hydromodification mitigation. During the detailed design phase of project development (i.e., upon submittal of small-lot tentative subdivision maps and/or improvement plans), this analysis would be conducted again to more accurately meet hydromodification impacts and peak discharge requirements of the final project, but the Modified Hydromodification Basin – Alternative "A" Model scenario was used as an estimation at this time in the planning process of how much additional storage volume would be required for hydromodification to accommodate the new land use plan. The changes made to the SunCreek drainage infrastructure and analyzed under this alternative provide results indicating that this alternative meets the hydromodification requirements while maintaining the storm runoff flow volumes and peak flow rates to less than the current Existing Conditions peak 100-year, 24-hour flow rates and volumes (MacKay & Somps 2011b:41). The modeled peak flow rates for the two hydromodification basin modeling alternatives as well as the Existing Conditions scenario are displayed in Table 3.9-12. The maximum detention basin discharge flow rates for Hydromodification Basin Alternatives "A" and "B" are displayed in Table 3.9-13.

The Modified Hydromodification Basin Alternative "B" Model used the Modified Hydromodification Basin Alternative "A" Model as a starting point and revised the model to account for the loss of the Anatolia III detention basin, as was analyzed in the Anatolia III Alternative A described above. Modeling results of peak flows at 13 compliance point locations under the Modified Hydromodification Basin Alternative "B" were compared to the Existing Conditions and Baseline Conditions peak flows for the 10-year and 100-year (0.01 AEP), 24-hour storm events, as shown in Table 3.9-12. The results show that peak flows would remain at or below existing conditions. As is the case with the Baseline Conditions scenario, in only one case (Compliance Point 12 under the 10-year, 24-hour scenario), a small increase in peak flow rates was identified in the modeling results; however, this increase would be minor and is not anticipated to affect downstream facilities. This alternative meets the hydromodification requirements (see Table 3.9-13) while maintaining the storm runoff flow volumes and peak flow rates to less than the current Existing Conditions peak 100-year, 24-hour flow rates and volumes (see Table 3.9-12).

Conclusion

As described in detail in Chapter 2, "Alternatives," the project applicants' preferred drainage plan incorporates the following combination of elements:

1. Modified Hydromodification Basin Alternative B;
2. Anatolia III Alternative A;
3. Community Park Alternative Detention Basin;
4. Stand-Alone Detention Basins 3, 5, and 7; and
5. Shalako Detention Basin (either modified or unmodified).

Table 3.9-12
Modeled Peak Flow Results at Project Compliance Point Locations for Hydromodification Basin Alternatives "A" and "B"

		10-Year, 24-hour Peak Flow Rate (cfs)				100-Year, 24-hour Peak Flow Rate (cfs)			
Compliance Point	Creek Section Station	Existing Conditions	"Baseline" Conditions[1]	Modified Hydromodification Basin Alternative "A"	Modified Hydromodification Basin Alternative "B"	Existing Conditions	"Baseline" Conditions[1]	Modified Hydromodification Basin Alternative "A"	Modified Hydromodification Basin Alternative "B"
1	0+00	1,025	N/A	N/A	N/A	1,801	1,737	1,669	1,674
2	36+00	1,036	N/A	N/A	N/A	1,810	1,740	1,674	1,678
3	70+00	989	N/A	N/A	N/A	1,741	1,632	1,553	1,556
4	76+19	848	808	808	773	1,501	1,354	1,248	1,242
5	80+95	848	809	809	774	1,504	1,354	1,282	1,285
6	82+00	849	811	811	779	1,508	1,354	1,284	1,287
7	112+05	826	763	763	727	1,518	1,321	1,267	1,268
8	152+00	402	372	372	374	669	631	523	536
9	61+45	N/A	N/A	N/A	N/A	127	127	127	127
10	184+50	386	293	293	N/A	635	512	458	N/A
11	212+00	332	216	216	317	591	347	246	243
12		157	161[2]	161[2]	161[2]	271	266	266	266
13		138	138	138	138	234	234	234	234

Note: cfs = cubic feet per second; N/A = not applicable

1 "Baseline" Condition as well as all alternative peak flows include the rerouting of the Morrison Spill through the proposed 72-inch-diameter pipeline in Kiefer Boulevard.

2 Modeled peak flows are greater than Existing Conditions peak flows. This is a reasonable conclusion since this modeling was performed as a "steady state" condition in SacCalc and not as an "unsteady state" condition in HEC-RAS. SacCalc results are known to be "conservative" when compared to HEC-RAS results. It, therefore, is the professional judgment of the engineers who modeled this stream (MacKay & Somps) that this higher peak flow rate will be eliminated when this configuration of detention basins is modeled HEC-RAS during final design.

Source: MacKay & Somps 2011b:20, 26, 39, 42

Table 3.9-13
Maximum Detention Basin Discharge Flow Rates for Hydromodification Basin Alternatives "A" and "B"

	"Baseline" Conditions				Hydromodification Basin Alternatives "A" and "B"[1]			
Basin Number	**No. of Orifices & Diameter (inches)**	**No. of Outlet Pipes & Diameter (inches)**	**10-Year, 24-Hour Flow (cfs)**	**100-Year, 24-Hour Flow (cfs)**	**No. of Orifices & Diameter (inches)**	**No. of Outlet Pipes & Diameter (inches)**	**10-Year, 24-Hour Flow (cfs)**	**100-Year, 24-Hour Flow (cfs)**
1	1-18	3-24	26	34	2-18	3-24	26	34
2	1-21	2-24	17	24	1-18	2-30	13	49
3	1-12	1-24	5	7	1-12	2-24	3	18
4	1-21	2-24	14	23	1-18	3-24	10	35
5	4-12	2-24	20	27	2-15	2-30	11	45
6	2-12	2-24	13	17	1-15	3-24	9	35
7	2-12	1-30	11	14	1-15	1-30	6	24
8	1-21	2-24	16	22	1-18	3-24	12	38
9	1-15	1-24	9	12	1-12	2-24	5	22
10	2-12	2-24	13	17	1-15	3-24	10	31
11	1-12	1-24	5	7	1-12	2-24	4	23
12	3-12	2-24	16	20	3-12	3-24	8	38

Note: cfs = cubic feet per second.
[1] The detention basin sizes are the same for Hydromodification Basin Alternatives "A" and "B" and the discharge flow rates from the outlet control structures designed to attenuate the release rates would be the same.
Source: MacKay & Somps 2011b:28, 41

The proposed detention basins have been designed in such a way that adjustments in detention volumes can be made during final design (or changes in orifice sizes and weir heights) to satisfy adopted design standards (which include assuring that the proposed detention basins empty by gravity and that maintenance issues are minimized). The proposed combination of drainage elements and alternatives listed above minimizes the area required for detention basins and maximizes the developable areas within the SPA; addresses drainage, water quality, flood control, and hydromodification issues; and provides the developers of Anatolia III the opportunity to reclaim 29 lots in the Anatolia III subdivision.

Modeling performed in the RMDS and subsequent technical memoranda based on the present stage in the SPA planning process (MacKay & Somps 2011b; 2010a; 2010b; 2010c; 2010d) indicates that the proposed drainage plan would appropriately convey upstream off-site runoff, would appropriately detain project-related on-site runoff in a manner that effectively meets current stormwater management criteria to acceptable levels, and that release rates from detention basins would be met to appropriately address hydromodification impacts. However, since detailed lotting plans at the tentative map level have not yet been prepared, the associated final detailed calculations and plans cannot be prepared at this time. Since the final designs and specifications have not been submitted to or approved by the City, it cannot be assumed that potentially significant impacts would not occur. Therefore, implementation of the Proposed Project and Modeling and Detention Basin Alternatives could result in **potentially significant**, **direct** and **indirect** impacts related to stormwater runoff and the subsequent risk of flooding and/or hydromodification. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3.9-2.

ID

The amount of stormwater runoff would be 18% higher under the Increased Alternative than under the Proposed Project Alternative because of the increased development area (approximately 160 acres more than the Proposed Project Alternative) and associated increase in impervious surfaces of residential and commercial land uses, as shown in Exhibits 2-26 in Chapter 2, "Alternatives."

To eliminate any flow increase or unacceptable hydromodification to Kite Creek caused by project development, stormwater detention facilities and basin outlet control devices would need to be constructed to maintain pre-development discharge rates. However, since detailed designs, specifications, and modeling under the Increased Development Alternative have not been performed, or submitted to or approved by the City, implementation of the Increased Development Alternative could result in **potentially significant, direct** and **indirect** impacts related to stormwater runoff and the subsequent risk of flooding. ***[Greater]***

Mitigation Measure: Implement Mitigation Measure 3.9-2.

Implementation of Mitigation Measure 3.9-2 would reduce the potentially significant impact associated with the potential increased risk of flooding from increased stormwater runoff under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level because the project applicants would demonstrate to the appropriate regulatory agency that the project would conform with applicable state and local regulations regulating surface water runoff, including the procedures outlined in the Sacramento City/County Drainage Manual (County of Sacramento Department of Water Resources 1996), which are designed to meet or exceed applicable state and local regulations pertaining to stormwater runoff. Specific project design standards as required in this mitigation measure would, when implemented, provide flood protection to meet FEMA 100-year (0.01 AEP) flood protection criteria, would safely convey on-site and off-site flows through the SPA, would reduce the effects of hydromodification on stream channel geomorphology, and would prevent substantial increased flood hazard on downstream areas by limiting peak discharges of flood flows to at or below pre-project levels.

IMPACT 3.9-3 **Long-Term Water Quality and Hydrology Effects from Urban Runoff.** *Project implementation would convert a large area of largely undeveloped land to residential and commercial uses, thereby changing the amount and timing of potential long-term pollutant discharges in stormwater and other urban runoff to Kite Creek, Laguna Creek, and other on- and off-site drainages.*

NP

Under the No Project Alternative, the project would not be developed and there would be no project-related changes in long-term water quality and hydrology relating to runoff. Thus, there would be **no direct** or **indirect** impacts under the No Project Alternative. ***[Lesser]***

NCP, BIM, CS

The amount of contaminants discharged in stormwater drainage would likely be lower under the No USACE Permit, Biological Impact Minimization, and Conceptual Strategy Alternatives than under the Proposed Project Alternative because of the decreased acreage and overall amount (e.g., number of dwelling units) of residential land uses, as shown in Exhibits 2-20 (NCP), 2-22 (BIM) and 2-24 (CS) in Chapter 2, "Alternatives." Further, the contaminant amounts would likely be lower than the Proposed Project Alternative, as each would result in a substantially reduced acreage of commercial land uses. However, because final design plans and specifications have not been prepared, or submitted to or approved by the City, implementation of the No USACE Permit, Biological Impact Minimization, and Conceptual Strategy Alternatives could result in **potentially significant, direct** and **indirect** impacts related to the potential for contaminants to enter receiving waters, thus resulting in adverse effects from long-term urban runoff. ***[Lesser]***

Mitigation Measure 3.9-3: Develop and Implement a BMP and Water Quality Maintenance Plan.

Before approval of the final small-lot subdivision map for all project phases, a detailed BMP and water quality maintenance plan shall be prepared by a qualified engineer retained by the project applicants for any particular discretionary development application. Drafts of the plan shall be submitted to the City of Rancho Cordova for review and approval concurrently with development of tentative subdivision maps for all project phases. The plan shall finalize the water quality improvements and further detail the structural and nonstructural BMPs proposed for the project. The plan shall include the elements described below.

- A quantitative hydrologic and water quality analysis of proposed conditions incorporating the proposed drainage design features.

- Predevelopment and postdevelopment calculations demonstrating that the proposed water quality BMPs meet or exceed requirements established by the City of Rancho Cordova and including details regarding the size, geometry, and functional timing of storage and release pursuant to the '"Stormwater Quality Design Manual for Sacramento and South Placer Regions" and the draft Hydromodification Management Plan ([SSQP 2007] per NPDES Permit No. CAS082597 WDR Order No. R5-2008-0142, page 46).

- Source control programs to control water quality pollutants on the SPA, which may include but are limited to recycling, street sweeping, storm drain cleaning, household hazardous waste collection, waste minimization, prevention of spills and illegal dumping, and effective management of public trash collection areas.

- A pond management component for the proposed basins that shall include management and maintenance requirements for the design features and BMPs, and responsible parties for maintenance and funding.

- LID control measures shall be integrated into the BMP and water quality maintenance plan. These may include, but are not limited to:

  - surface swales;
  - replacement of conventional impervious surfaces with pervious surfaces (e.g., porous pavement);
  - impervious surfaces disconnection; and
  - trees planted to intercept stormwater.

- New stormwater facilities shall be placed along the natural drainage courses within the SPA to the extent practicable so as to mimic the natural drainage patterns. The reduction in runoff as a result of the LID configurations shall be quantified based on the runoff reduction credit system methodology described in "Stormwater Quality Design Manual for the Sacramento and South Placer Regions, Chapter 5 and Appendix D4" (SSQP 2007) and proposed detention basins and other water quality BMPs shall be sized to handle these runoff volumes.

Implementation: Project applicants for any particular discretionary development application.

Timing: Prepare plans before the issuance of grading permits for all project phases and implementation throughout project construction.

Enforcement: City of Rancho Cordova Community Development Department and Public Works Department.

PP

As described in the draft Conservation Element of the Sacramento County General Plan, surface water quality is threatened by such concerns as development, stormwater runoff, and increased diversions into both surface and sub-surface sources (County of Sacramento 2009). New developments, infrastructure improvements, redevelopment projects of existing land uses, and comprehensive planning efforts in master planned new growth areas are described in the draft Sacramento County General Plan as having an effect on water quality by both reducing potential supply as well as creating a source for increased pollutant runoff. Project development would result in the conversion of primarily undeveloped land to urban land uses, which would alter the types, quantities, and timing of contaminant discharges in stormwater runoff. Project development would result in changes to land use, natural vegetation, and infiltration characteristics of the SPA and would introduce new sources of water pollutants, thereby producing "urban runoff." Pollutants contained within urban runoff may include but are not limited to sediment, oxygen-demanding substances (e.g., organic matter), nutrients (primarily nitrogen and phosphorus), heavy metals, bacteria, oil and grease, and toxic chemicals, which can degrade receiving water quality.

Overall, the potential for the Proposed Project Alternative to cause or contribute to long-term discharges of urban contaminants (e.g., oil and grease, fuel, trash) into the stormwater drainage system and ultimate receiving waters would increase compared to existing conditions. Some contaminants associated with existing on-site agricultural activities (e.g., sediment, nutrients, pathogens, and agricultural chemicals) would decrease as these uses are phased out during project development. The potential discharges of contaminated urban runoff from paved and landscaped areas could increase or could cause or contribute to adverse effects on aquatic organisms in receiving waters. New residential uses within the SPA would generate urban runoff from streets, driveways, and parking areas. Landscaped areas may produce fertilizer wastes and/or bacterial contamination from animal excrement.

New commercial development can generate urban runoff from parking areas as well as any areas of hazardous materials storage exposed to rainfall.

Urban contaminants typically accumulate during the dry season and may be washed off when adequate rainfall returns in the fall to produce a “first flush” of runoff. The amount of contaminants discharged in stormwater drainage from developed areas varies based on a variety of factors, including the intensity of urban uses such as vehicle traffic, types of activities occurring on site (e.g., residential vs. commercial), types of contaminants used on-site (e.g., pesticides, herbicides, cleaning agents, or petroleum byproducts), contaminants deposited on paved surfaces, and the amount of rainfall.

Several policies have also been incorporated into the Draft SunCreek Specific Plan (attached as Appendix C) to protect water quality during project operations, including:

- Policy NR 13. The applicant shall install appropriate signage to deter the discharge of hazardous materials into storm drains. Such signage shall be approved by the City of Rancho Cordova.
- Policy NR 14. All Tentative Maps shall contain urban runoff control strategies and requirements that are consistent with Master Drainage Plans and the City’s urban runoff management program. Such strategies may include participation in an area-wide runoff control management effort consistent with standards developed by the Public Works Department.
- Policy NR 15. All commercial and multifamily development shall incorporate features such as grassy swales, multi-use retention or detention basins, and integrated drainage systems to enhance water quality. Where feasible the project applicants will work with the CRPD to integrate retention/detention basins into park sites and create examples of desirable and innovative natural drainage features.
- Policy NR 16. All development within the Plan area shall apply best management practices to protect receiving waters from the adverse effects of construction activities, sediment and urban runoff.

The Draft SunCreek Specific Plan (attached as Appendix C) describes that stormwater and other drainage would be carried in subsurface pipes to the detention basins throughout the SPA where it would be treated prior to release into the proposed preserve areas. Detention facilities would be located at the edge of the drainage corridor where they would intercept runoff from the adjacent development areas before the water enters the proposed preserve areas. Stormwater quality features would be designed to reflect the water volumes, terrain, and specific conditions at each site. Stormwater quality improvement facilities would generally be integrated into detention basins or may be located as independent facilities in the open space buffer areas between the developed areas and the proposed preserve area (e.g., vegetated swales, infiltration trenches, and/or constructed wetland filter strips). Stormwater quality improvement facilities would incorporate settling basins, gravel and sand or other filter medium, and biological filters such as grassy swales or other approved technologies to trap pollutants as the runoff flows through them. In addition, all facilities that discharge water to the proposed preserve area would be designed to avoid soil erosion through the use of velocity dissipation devices and other erosion controls.

Stormwater quality treatment configurations would use treatment methodologies as described in the Stormwater Quality Design Manual (SSQP 2007) and approved by the City. The Sacramento NPDES MS4 Permit (described in above in Section 3.9.2 “Regulatory Framework”), which applies to this SPA, requires that “priority new development and redevelopment projects shall integrate LID principles early in the project planning and design process.” As described above, the LID techniques may include vegetated swales, infiltration trenches, constructed wetland filter strips, underground pipes, and detention basins. Detention basins would be placed primarily along the edge of the primary drainage corridor trail to mimic the natural drainage patterns. In addition, distributed components including infiltration and bioretention (e.g., swales and bioretention planters) in parking areas, streets, paseos, and pedestrian corridors may be integrated.

The proposed water quality detention basins were sized based on criteria outlined in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions (MacKay & Somps 2011b; SSQP 2007). Detention basins were sized such that the flow rates exiting the SPA boundaries would not exceed the existing conditions flow rates and outlet (MacKay & Somps 2011b:16). They should also be sized based on the criteria outlined in the Draft Hydromodification Management Plan (Submitted to the Regional Board and pending approval). Outlet control structures were designed to meter the release rates so they match the predevelopment flow rates for the same sized drainage shed area.

Table 3.9-14 shows the preliminary water quality volumes required within each proposed detention basin. The water quality basin sizing and design configuration for each watershed would be finalized during the final design stages (i.e., when small-lot tentative subdivision maps and/or improvement plans are submitted).

Water quality BMPs, including those to be used for the Proposed Project Alternative and shown in Table 3.9-14, such as vegetated swales, constructed wetlands, infiltration trenches, and detention basins have been shown to be successful in controlling water quality and avoiding water quality impacts (SSQP 2007:VS-1, CWB-1, IT-1, DB-1). Pollutants are removed from stormwater in detention basins through gravitational settling and biological processes depending on the type of basin. Some basins may incorporate permanent wet detention which may enhance pollutant removal through biological and chemical processes (SSQP 2007:DB-2).

Table 3.9-14
Project Site "Baseline" Conditions Water Quality Basins and Volumes[1]

Basin Number	Total Basin Area (acres)	Water Quality Volume (acre-feet)[2]
1	2.22	2.5
2	4.30	3.4
3	4.60	2.2
4	6.19	3.8
5	9.43	5.7
6	4.63	3.0
7	2.56	1.5
8	5.26	3.6
9	3.99	2.3
10	2.47	1.9
11	0.69	0.4
12	4.30	2.7
Total	50.64	32.9

Notes:
[1] The water quality volume contribution to the detention basin volume is considered dead storage volume and is not included in the detention storage volume calculations.
[2] Detention bases are designed with a water quality component with a wet basin minimum depth of 4 feet.
Source: MacKay & Somps 2011b:27

Modeling and Detention Basin Alternatives

The Anatolia III Modeling Alternatives and Modified Hydromodification Basins Modeling Alternatives are variations of the Proposed Project Alternative that would involve modified detention basin sizing and the potential relocation of drainage infrastructure (e.g., detention basins and/or channels and box culverts) from the adjacent Anatolia III development to the SunCreek SPA. The Detention Basin Alternatives would also involve modification of detention basin sizing to accommodate potential alternate design options. The Anatolia III Modeling Alternatives and Detention Basin Alternatives would only result in potential modifications to stormwater drainage system infrastructure design and would not be expected to increase the potential for the Proposed Project Alternative to cause or contribute to long-term discharges of urban contaminants into the stormwater drainage system and receiving waters. These alternatives would be subject to the policies that have also been incorporated into the SunCreek Specific Plan to protect water quality during project operations (described above). The Anatolia III Modeling Alternatives and Detention Basin Alternatives would also be required to use treatment methodologies as described in the Stormwater Quality Design Manual and abide by requirements of the Sacramento NPDES MS4 Permit.

Conclusion

However, because final design plans and specifications have not been submitted to or approved by the City, implementation of the Proposed Project Alternative could result in contaminants entering receiving waters, thus resulting in adverse effects from long-term urban runoff. Because the Proposed Project Alternative could result in impacts on water quality within on-site drainage channels and ultimately off-site drainage channels as a result of runoff from the SPA, the project-related water quality impacts would be both **direct** and **indirect**, and would be **potentially significant**.

Mitigation Measure: Implement Mitigation Measure 3.9-3.

ID

Under the Increased Development Alternative, the amount of contaminants discharged in stormwater drainage would likely be higher than under the Proposed Project Alternative because of the higher acreage and overall amount (e.g., number of dwelling units) of residential land uses, as shown in Exhibit 2-28 (ID) in Chapter 2, "Alternatives." Potential contaminant discharges from commercial land uses, however, would likely be less than the Proposed Project Alternative, as this alternative would result in approximately 74 fewer acres of commercial land uses. However, because final design plans and specifications have not been prepared, or submitted to or approved by the City, implementation of the Increased Development Alternative could result in **potentially significant, direct** and **indirect** impacts related to the potential for contaminants to enter receiving waters, thus resulting in adverse effects from long-term urban runoff. ***[Similar]***

Mitigation Measure: Implement Mitigation Measure 3.9-3.

Implementation of Mitigation Measure 3.9-3 would reduce the potentially significant impact associated with potential long-term water quality effects of urban runoff under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level because the project applicants of all project phases would develop and implement a BMP and water quality maintenance plan that would demonstrate to the City that the Project Alternative would conform to applicable state and local regulations restricting surface water runoff including the Stormwater Quality Design Manual for the Sacramento and South Placer Regions (SSQP 2007) and the draft Hydromodification Management Plan. The permanent BMPs proposed for the stormwater treatment system and described in detail in the Stormwater Quality Design Manual have been shown to be effective in reducing contaminant levels in urban runoff if designed, constructed, and maintained properly (EPA 1999, CASQA 2010) (see Table 3.9-15).

Table 3.9-15 Expected Pollutant Removal Efficiency of Structural BMPs					
BMP Type	**Typical Pollutant Removal (%)**				
	Suspended Solids	**Nitrogen**	**Phosphorus**	**Pathogens**	**Metals**
Dry detention basins	30–65	15–45	15–45	<30	15–45
Wet detention/retention basins	50–80	30–65	30–65	<30	50–80
Constructed wetlands	50–80	<30	15–45	<30	50–80
Infiltration basins	50–80	50–80	50–80	65–100	50–80
Infiltration trenches, dry wells	50–80	50–80	15–45	65–100	50–80
Porous pavement	65–100	65–100	30–65	65–100	65–100
Grassed swales	30–65	15–45	15–45	<30	15–45
Vegetated filter strips	50–80	50–80	50–80	<30	50–80
Surface sand filters	50–80	<30	50–80	<30	50–80
Other media filters	65–100	15–45	<30	<30	50–80

Note: BMP = best management practices
Source: U.S. EPA 1999:Table 5-7

IMPACT 3.9-4 **Potential Exposure of People or Structures to a Significant Risk of Flooding as a Result of the Failure of a Levee or Dam**. *The SPA is not in an area protected by levees and is not located within the Folsom Dam inundation zone.*

NP

Under the No Project Alternative, no development would occur at the SPA. Therefore, there would be **no direct** or **indirect** impacts to people or structures related to flooding as a result of the failure of a levee or dam. ***[Lesser]***

NCP, PP, BIM, CS, ID

For planning purposes, the State Office of Emergency Services (OES), with information from the U.S. Bureau of Reclamation and DWR, has the responsibility to provide local governments with critical hazard response information, including information related to potential flooding from levee failure or dam inundation.

The SPA is bordered to the west by the Folsom South Canal, which is a concrete-lined canal. The canal was constructed in the 1970s and is owned and operated by the U.S. Bureau of Reclamation. The headworks for the canal are located at Nimbus Dam on the American River, just southwest of Folsom Dam and Lake. The Folsom South Canal is bounded by bermed material which was excavated during canal construction, but these berms do not serve a flood control purpose. The project would include detention basins that would primarily be constructed above the original ground surface and would have a levee or dam structure that would regulate flows before entering the preserve. These detention basins would have a broad, flat slope and would not fall under Division of Safety of Dams (DSOD) jurisdiction. Therefore, the SPA is not in an area protected by levees and no new levees or dams are proposed as part of the project that would be considered under DSOD jurisdiction for dam safety.

Although the Folsom Dam is located approximately 13 miles north of the SPA, the SPA is not located within the OES dam inundation zones. While a relatively large portion of Sacramento County would be inundated with water in the event of a dam or dike failure, the SPA is outside of the mapped inundation area (County of

Sacramento n.d.:384, Figure III-4). Implementation of any of the project alternatives would do nothing to increase the potential for dam failure. In addition, a dam failure plan, the flooding ALERT system, and evacuation procedures are integrated into Sacramento County's Emergency Operations Plan (County of Sacramento 2008:Part 2, 1). Therefore, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.9-5	**Potential Impacts from New Impervious Surfaces and the Use of Groundwater Resources on Groundwater Recharge and Aquifer Volume.** *Shallow and deep percolation of rainwater and water used for landscape irrigation and related runoff and consequent depth to groundwater would not be substantially affected by the development of additional impervious surfaces because of the low permeability of existing on-site soils, which would not result in a substantial adverse impact on groundwater recharge. The use of groundwater resources to supply a portion of the project's water demands would not substantially deplete groundwater supplies and therefore would not result in a net deficit in aquifer volume.*

NP

Under the No Project Alternative, no development would occur at the SPA; therefore, there would be **no direct** or **indirect** project-related impacts on groundwater levels from new impervious surfaces, changes in landscape irrigation, or changes in groundwater resource extraction. ***[Lesser]***

NCP, PP, BIM, CS, ID

Effects of New Impervious Surfaces on Groundwater Recharge

Planned development of the Proposed Project and the other four action alternatives would include increases in impervious surfaces and the amount of surface runoff. Of the approximately 1,265 acres in the SPA, approximately 869 acres would be developed with residential and commercial land uses, as well as schools and infrastructure as part of the Proposed Project Alternative. The remaining approximately 396 acres would be retained as open space, including a wetland preserve and associated wetland preserve buffer area located along the existing drainage of Kite Creek. The proposed detention basins would also provide some groundwater recharge through localized infiltration where subsurface conditions allow. Under the No USACE Permit, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives, 606, 730, 827, and 1,072 acres of land would be developed, respectively, with the remainder retained as wetland preserve, and other undeveloped land uses. The No USACE Permit Alternative would result in the smallest increase in impervious surfaces. The Increased Development Alternative would result in greatest increase in impervious surface due to the higher amount of urban development and associated impervious surface proposed, and the decreased amount of wetland preserve and other undeveloped land uses.

As described in Subsection 3.9.1, "Groundwater Hydrology" above, soils in the SPA and surrounding area have a poor capacity for groundwater recharge, with most of the substantial recharge occurring along active stream channels. Only small amounts of precipitation per year are expected to infiltrate to the groundwater aquifer under undeveloped conditions, with the remaining water running off or consumed through evapotranspiration. Those areas within the SPA that are most conducive to groundwater recharge, e.g. Kite Creek and its tributary corridors, would generally be maintained in open space and would continue to allow for infiltration. Detention basins and percolation trenches proposed as part of the project, as well as the LID features described in Mitigation Measure 3.9-3 (if implemented), would also be designed to infiltrate excess runoff and percolate nuisance flows. Furthermore, increased seasonal groundwater recharge from landscape irrigation activities would occur with the transition of the SPA from primarily dry land farming and grazing lands. Urban land uses result in application of water, in addition to precipitation, for outdoor use. A portion of this water, although restricted by the soil conditions described above, reaches the aquifer as recharge. It should be noted, however, that indoor uses of water would not contribute to local groundwater recharge, as this water is discharged to the Sacramento River after treatment at the Sacramento Regional Wastewater Treatment Plant. Therefore, for the reasons stated above, the **direct** impact to groundwater recharge from development of new impervious surfaces would be **less than significant. No indirect** impacts would occur. ***[Similar]***

Direct Effects to Aquifer Volume from Use of Groundwater

Project-specific water supply and demand impacts are addressed in Section 3.17 "Water Supply" of this DEIR/DEIS. The analysis in this section addresses the project's potential for direct effects to depletion of groundwater supplies and aquifer volume from use of groundwater, in particular groundwater from the proposed on-site wells. SCWA anticipates that water service to the SPA would be provided in three phases, depending the start of construction activities within the SPA (MWH 2008, attached as Appendix U to this DEIR/DEIS). Phase 1 water service would involve using available groundwater supplies from the North Vineyard Well Field (NVWF) and the Mather Housing groundwater system until NSA water demands approach the capacity of these groundwater wells. Phase 2 water service would entail using available SCWA groundwater supplies and surface water delivered by the NSAP. Phase 3 water service would not occur until the water demands of the NSA begin to approach the capacity of the NSAP. At that time, SCWA anticipates that the Vineyard Surface Water Treatment Plant (WTP), NVWF, and Anatolia WTP would be expanded to their full capacity to meet water demands of the NSA, including the SPA. (MacKay & Somps 2011a:6) Furthermore, three groundwater wells and a water treatment plant on the SunCreek SPA are proposed as part of this project in order to provide an additional source of water supply, if needed (see Exhibit 2-8 in Chapter 2, "Alternatives"). The on-site groundwater wells are not projected for use until full project buildout in 2030, and would only be used to meet peaking and/or backup demands (if necessary). The primary source of water supply for the SPA is the NSAP. The NSAP, along with the other water supply sources listed above, are described in detail on pages 3.17-14 through 3.17-17 of Section 3.17, "Water Supply." In the long term, SCWA anticipates the majority of water demands in the NSA would be met with surface water. However, the year-to-year mix of surface and groundwater varies depending on a large number of variables and SCWA would adjust the amount of groundwater and surface water as necessary to meet the demands of the NSA as part of its conjunctive use program (described further in Section 3.17, "Water Supply") (MacKay & Somps 2011a:8, SCWA 2006:4-31).

The water supply impacts related to use of water from the NVWF were evaluated in the *Revised Recirculated Sunrise Douglas Community Plan and Sunridge Specific Plan Environmental Impact Report* (SDCP/SRSP EIR) (AECOM 2011), which was certified in November of 2011. The SDCP/SRSP EIR is hereby incorporated by reference. Pages 3-1 through 3-50 of the SDCP/SRSP DEIR determined that all water supply impacts were less than significant (i.e., increased demand for long-term supplies [pages 3-32 through 3-42]; contribution to impacts identified in the *Zone 40 Water Supply Master Plan Draft Environmental Impact Report* [Zone 40 WSMP EIR] [pages 3-42 through 3-43]; and the need for water conveyance facilities to deliver supplies, including contributions to impacts identified from other infrastructure supply projects such as the NSAP [pages 3-44 through 3-46]).

The amount of groundwater that would be extracted by SCWA to serve the NSA, including the SPA, was included in the Zone 40 WSMP EIR (SCWA 2003). Furthermore, the proposed groundwater wells within the SPA are not intended solely for the use of the SunCreek Specific Plan Project; rather, they are part of SCWA's regional water supply facilities that were included in the *Zone 40 Water System Infrastructure Plan* (Zone 40 WSIP) (SCWA 2006), which was prepared to address how identified 2030 water supplies in both the Zone 41 UWMP and the Zone 40 WSMP would be allocated among users within its service area. The SPA is located within Zone 40. The WSIP describes and quantifies the facilities necessary to extract, treat, and convey groundwater to the Zone 40 service area; describes provision of water purchased from the City of Sacramento to the portion of Zone 40 within the City of Sacramento American River Place of Use; describes conveyance of surface water for treatment at the Vineyard Surface WTP; and describes delivery of wholesale treated groundwater and surface water to retail water purveyors outside of the Zone 40 service area (SCWA 2006:1-3).

The Zone 40 WSIP provides the most up-to-date information on Zone 40's water supplies, demands, and infrastructure; provides project-level detail that is necessary for implementation of the preferred pipeline alignment alternatives that were identified in the 2005 Zone 40 WSMP; and it fills in the gaps of associated smaller infrastructure requirements, including a description of facility construction and phasing as well as operational requirements from existing conditions through ultimate buildout of the water system.

SCWA is a signatory to the Water Forum Agreement (WFA), which is a plan that provides for the effective long-term management of the Sacramento region's water resources. The WFA was formulated based on the two coequal objectives of the Water Forum: (1) provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and (2) preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. (Sacramento City-County Office of Metropolitan Water Planning 1999, Water Forum 2000.)

As a signatory to the WFA, SCWA undertook a comprehensive update of its water supply planning process in response to the requirements of the WFA through the Zone 40 WSMP, which was adopted in February 2005. SCWA has agreed to ensure that a series of actions and commitments related to surface-water diversions, dry-year supply, water conservation, and groundwater management—necessary steps to achieve WFA objectives—are integrated into future growth and water planning activities in its service area. The Zone 40 WSMP provides a flexible plan of water management options that can be implemented and modified if conditions that affect the availability and feasibility of water supply sources change in the future. The goal of the Zone 40 WSMP is to carry out a conjunctive-use program, which is defined as the coordinated management of surface water and groundwater supplies to maximize the yield of available water resources. The conjunctive-use program for Zone 40 includes the use of groundwater, surface water, remediated water, and recycled water supplies. It also includes a financing program for the construction of a new surface-water diversion structure; a surface-water treatment plant; water conveyance pipelines; and groundwater extraction, treatment, and distribution facilities.

The Zone 40 WSMP evaluates several options for facilities to deliver surface water and groundwater to development in a subarea within Zone 40 known as the 2030 Study Area, as well as the financing mechanisms to provide water to the 2030 Study Area. (City of Rancho Cordova 2006a). The 2030 Study Area encompasses approximately 46,600 acres (including portions of the cities of Elk Grove and Rancho Cordova, and the SPA) where development of industrial, commercial, office, and residential land uses is expected to occur and where demand for water is expected to be concentrated during the planning horizon of the WSMP (i.e., 2030) (see Exhibit 3.17-1 in Section 3.17, "Water Supply"). (City of Rancho Cordova 2006a).

SCWA prepared and adopted the Zone 41 UWMP in June of 2011 to address water supply and demand issues, water supply reliability, water conservation, water shortage contingencies, and recycled-water usage for the areas within Sacramento County where Zone 41 provides retail water services, including Zone 40. Water supplies and demands within SCWA Zone 40 would be the same during normal, single-dry, and multiple-dry years; however, the year-to-year mix of surface and groundwater would be adjusted as necessary to meet the demands as part of SCWA's conjunctive use water supply program. Groundwater use is projected to decrease from the current level now that the Vineyard Surface WTP is operational (it came online in late fall 2011); but it will increase over time as water demand continues to grow in Zone 40. In wet and normal years, groundwater pumping will be minimized because surface water becomes the major water supply source. In dry years, groundwater pumping will increase substantially as surface water availability is considerably reduced. Reduction in projected pumping in wet/normal years between 2010 and 2035 reflects the phasing and availability of surface water facilities and supplies from the Vineyard Surface WTP. Over time, groundwater production will stabilize as SCWA's conjunctive use program is fully implemented. (SCWA 2011a:4-16; SCWA 2011b:5 and 17.) This conjunctive use program is consistent with the provisions of the WFA that limited the long-term annual average of groundwater extraction rate from the Central Basin at or below 273,000 acre-feet per annum.

In summary, SCWA will provide water to the project through a combination of off-site surface and groundwater supplies, and on-site groundwater wells that were included the Zone 40 WSIP. SCWA currently exercises, and will continue to exercise, its rights as a groundwater appropriator and will extract water from the Central Basin for the beneficial use of its customers. SCWA is a signatory to the WFA, which provides for the effective long-term management of the Sacramento region's water resources to (1) provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and (2) preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. (Sacramento City-County Office of Metropolitan Water Planning 1999, Water Forum 2000).

Therefore, for the reasons stated above, the use of groundwater to meet a portion of the water supply needs of the SPA would not substantially deplete groundwater supplies and thus would not result in a net deficit in aquifer volume. Thus, this **direct** impact is considered **less-than-significant.** ***[Similar]***

Indirect Effects from Use of Groundwater

Cosumnes River Flows Water levels in the Cosumnes River have been shown to affect migratory fish species. The indirect impact of SCWA's use of groundwater on water levels in the Cosumnes River, as part of its conjunctive use program to serve its customers in the City and the region, was evaluated in the SDCP/SRSP EIR (AECOM 2011). The SDCP/SRSP EIR determined as follows:

> [As] noted in Chapter 3, "Water Supply," of this Revised DEIR, the refined SacIGSM modeling conducted for the Zone 40 WSMP FEIR confirmed that there would be no substantial changes in average groundwater levels at simulated locations near the river as a result of the additional groundwater pumping. Because of the hydraulic disconnection between the aquifer and the channel along much of the valley floor reach of the Cosumnes River channel, any project-related changes in groundwater levels would not result in direct losses or changes in surface flows in these already disconnected reaches. Moreover, average annual streamflows would increase slightly under the cumulative condition as a result of conjunctive use operations that result in reduced groundwater reliance during wet year types relative to the base condition, thus resulting in greater conservation of the groundwater supplies than would otherwise occur without conjunctive use. Additionally, SacIGSM modeling showed there would be minimal to no changes in average groundwater levels or river flows at locations near the river where hydraulic connections to the aquifer remain. Because the adverse hydrologic conditions have existed historically and because groundwater pumping, as assessed in the Zone 40 WSMP EIR, would result in minimal changes in average groundwater levels and not otherwise affect hydraulically disconnected reaches, SDCP/SRSP implementation would not result in a cumulatively considerable incremental contribution to the significant cumulative impact on fisheries and aquatic resources of the Cosumnes River. (AECOM 2011:4-28.)

Contaminated Groundwater Plumes As stated above, the project is expected to rely primarily on surface water supplied by the NSAP. The small amount of water that could be used for the SunCreek Specific Plan Project at full project buildout to meet peaking and/or backup demands (if needed) from on-site SCWA groundwater wells is not expected to result in a substantial change in the movement of the off-site contaminated groundwater plumes in the project vicinity.

Therefore, the **indirect** impacts of use of groundwater to meet part of the water supply needs of the SPA are considered **less than significant.** ***[Similar]***

Mitigation Measure: No mitigation measures are required.

3.9.4 RESIDUAL SIGNIFICANT IMPACTS

With implementation of the mitigation measures listed above, project implementation would not result in any residual significant impacts related to short-term alteration of drainages and associated surface water quality and sedimentation, increased risk of flooding or hydromodification from stormwater runoff, water quality and hydrology effects from long-term urban runoff, or groundwater levels.

3.9.5 CUMULATIVE IMPACTS

Local hydrology, drainage, and water quality conditions are often affected by regional activities. Past and present projects from areas within the Sierra Nevada mountains (e.g., the construction of dams and reservoirs, mining operations, logging operations, and urban development) to projects within the Sacramento–San Joaquin Delta (e.g., water supply diversions, agricultural diversions, flood control projects, urban development, and river channelization) affect hydrology and water quality conditions in Sacramento County. The following evaluation of cumulative hydrology, drainage, and water quality impacts is made in light of the extent to which local and regional activities can affect hydrologic conditions in Sacramento County. However, the focus is on effects to water bodies in the project vicinity and immediately upstream and downstream (e.g., Kite Creek and Laguna Creek) and how the SunCreek project and related projects may affect the hydrology, drainage, and water quality conditions locally.

SURFACE WATER QUALITY

Construction activities during implementation of the SunCreek project would involve extensive grading and movement of earth. Substantial construction-related alteration of on-site drainages could result in soil erosion and stormwater discharges of suspended solids, increased turbidity, and potential mobilization of other pollutants from project-related construction sites. This contaminated runoff could enter Kite Creek or other on-site drainage channels and ultimately drain off site. Intense rainfall and associated stormwater runoff in relatively flat areas could result in short periods of sheet erosion within areas of exposed or stockpiled soils. If uncontrolled, these soil materials could cause sedimentation and blockage of drainage channels. Accidental spills of construction-related contaminants, such as fuels, oils, paints, solvents, cleaners, and concrete, could occur during construction activities in the SPA, resulting in surface soil contamination. The SunCreek project applicants must prepare a SWPPP consistent with the existing statewide NPDES discharge permits from the Central Valley RWQCB. Implementation of these regulatory requirements in addition to Mitigation Measure 3.9-1 would reduce the potentially significant water quality and erosion impacts from project-related construction activities to a less-than-significant level. Although there are no assurances that the related projects would incorporate the same degree or methods of treatment as the SunCreek project, each related project that would discharge stormwater runoff would be required to comply with NPDES discharge permits from the Central Valley RWQCB. Therefore, the SunCreek project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to construction-generated runoff and water quality impacts to receiving water bodies

The project, along with several other planned projects in the community and waste stream facilities associated with the Kiefer Landfill Buffer Planning Project adjacent to the SPA to the east would have the potential to increase stormwater runoff through the creation of new impervious surfaces and landscape features. This increase in impervious surfaces could cause or contribute to long-term discharges of urban contaminants (e.g., sediment, oil and grease, fuel) to the Laguna Creek Watershed. Under the SunCreek project, all drainage runoff would enter detention basins where it would be treated prior to release. Detention basins and other stormwater quality treatment techniques (BMPs) would use treatment methodologies as described in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions (SSQP 2007) and would be required to comply with the Sacramento NPDES MS4 Permit. In addition, detention basins for the SunCreek project were sized such that the flow rates exiting the SPA boundaries would not exceed the existing conditions flow rates and outlet control structures were designed to meter the release rates so they match the predevelopment flow rates for the same sized drainage shed area. Although there are no assurances that the related projects would incorporate the same degree or methods of long-term treatment and hydromodification controls as the SunCreek project, each related project that would discharge stormwater runoff would be required to comply with the Sacramento NPDES MS4 Permit from the Central Valley RWQCB and associated requirements of the design criteria identified in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions. Therefore, the SunCreek project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to operational runoff and water quality impacts to receiving water bodies.

SURFACE DRAINAGE AND FLOOD CONTROL

The SPA is not in an area protected by levees and is not located within the Folsom Dam inundation zone. The drainage facilities identified as part of the SunCreek project would be constructed to safely control and convey stormwater runoff and have been designed to satisfy the design criteria of the Stormwater Quality Design Manual, FEMA National Flood Insurance Program requirements, and the NPDES requirements. Proposed detention/water quality basins and outlet controls are designed to reduce peak runoff leaving the site to match or be less than the predevelopment flow rates. Modeling results indicated that the 100-year (0.01 AEP) and 10-year storm events would remain at or below existing conditions. Detention basins include percolation trenches to reduce potential effects to existing stream channels from summer nuisance flows. Future development upstream of the SPA would be required to meet similar standards through project-specific mitigation. While the related projects may be located in areas protected by levees and may place housing within a 100-year floodplain, each of the related projects would be required to satisfy the design criteria of the Stormwater Quality Design Manual, FEMA National Flood Insurance Program requirements, and the NPDES requirements, including protection of residents and workers from 100-year storm events. Therefore, a cumulative impact would not occur, and the SunCreek project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to surface drainage and flood control.

GROUNDWATER LEVELS

Changes in groundwater levels as a result of increased impervious surfaces have the potential to occur in the project vicinity as planned urban development continues to occur in the area. Planned development under the SunCreek project and the related projects would include increases in impervious surfaces and surface runoff generated by proposed development. However, soils in the SPA and surrounding area have a poor capacity for groundwater recharge, with most of the substantial recharge occurring along active stream channels. Most of the areas within the SPA that are most conducive to groundwater recharge, such as the Kite Creek and tributary corridors, would be maintained as open space and therefore would allow for continued infiltration and groundwater recharge. Detention basins proposed as part of the project, and LID features recommended in Mitigation Measure 3.9-3 (if implemented), as well as landscape irrigation activities, would contribute to groundwater recharge if they are sited or occur in areas that have conducive soils. The development of surface water supplies as part of SCWA's Zone 40 WSIP would decrease the reliance on groundwater supplies over time throughout the NSA. SCWA supplies water to its customers based on a conjunctive use program. As a signatory to the WFA, SCWA is committed to the effective long-term management of the Sacramento region's water resources to (1) provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and (2) preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. (Sacramento City-County Office of Metropolitan Water Planning 1999, Water Forum 2000). Therefore, a cumulatively significant impact would not occur, and the project itself would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to groundwater levels and recharge.

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3.10 LAND USE AND AGRICULTURAL RESOURCES

3.10.1 AFFECTED ENVIRONMENT

EXISTING LAND USES

Specific Plan Area

The 1,265.5-acre SPA is located within the Sunrise Douglas Community Plan area in the city limits of the City of Rancho Cordova, California in eastern Sacramento County (see Exhibits 2-1 and 2-2 in Chapter 2, “Alternatives”). The SPA is located south of Douglas Road, north of Jackson Highway (i.e., State Route [SR] 16), west of Grant Line Road, and east of Sunrise Boulevard.

The SPA is identified in the City of Rancho Cordova General Plan as part of the SunCreek/Preserve Planning Area (City of Rancho Cordova 2006). The City General Plan assumes that the SunCreek portion of the planning area would encompass 1,762 acres, develop 5,104 dwelling units, and generate 1,331 jobs and 13,526 new residents by 2030 (City of Rancho Cordova 2006, City of Rancho Cordova 2009).

The SPA is generally undeveloped land that has been used for dry land farming and grazing on spring grasses. Five rural residences are located within the approximate center of the SPA. The SPA is zoned as AG-80 and AG-20, and the land use is designated as the “SunCreek/Preserve Planning Area” on the City General Plan Land Use Map (see Exhibit 3.10-1). The AG-80 and AG-20 zoning designations accommodate a wide range of agricultural uses, such as crop production, animal keep, and commercial agricultural-related uses (e.g., stables), on parcels greater than or equal to 80 acres and 20 acres, respectively (City of Rancho Cordova 2009). The land use designation of Planning Area is used to conceptually indicate areas where incorporated parts of the city may be developed to contain a variety of land uses, including: residential, commercial, institutional, recreational, and open space (City of Rancho Cordova 2006).

Adjacent Land Uses

Land in Rancho Cordova south of U.S. 50 is in the process of urbanizing, and various residential, commercial, and mixed-use projects in the vicinity of the proposed SunCreek project are either in the planning process, under environmental review, have been approved, or are under construction. Adjacent land uses include the Anatolia III development, which has been partially constructed, but is still under construction to the west; and vacant land to the north, east, and south. Other nearby land uses include Kiefer Landfill, located approximately 1 mile southeast of the SPA, and the Sacramento Rendering Company, which is located southwest of the SPA at the intersection of Sunrise Boulevard and Kiefer Boulevard (see Section 3.2, “Air Quality” for additional details about these facilities). Mather Airport (formerly Mather Air Force Base) is located approximately 3 miles northwest of the SPA. There are no designated airport land use zones that overlap with the SPA.

PLANNED LAND USES

There are numerous development projects planned in the vicinity of the SPA. As depicted in Exhibit 3.0-1 (see Section 3.0.2, “Cumulative Context”), north of the project, land is planned or constructed as individual developments, including Anatolia I, II, and IV and Montelena to the northwest; Sunridge Lot J, Sunridge Park, Douglas 103 and 98, Grantline 208, The Ranch at Sunridge, and Arista Del Sol to the north and northeast; and Arboretum to the south. In addition, the area east of Grant Line Road, outside of the Rancho Cordova city limits in eastern Sacramento County, is planned for scattered development. Reasonably foreseeable projects in this area include the Cordova Hills development, Excelsior Estates, Teichert Quarry, Walltown Quarry, and De Silva Gates Quarry (see Section 3.0.2, “Cumulative Context,” for more information).

Planning Areas

The City General Plan contains 16 Planning Areas. The City has included Conceptual Land Plans to show general locations of natural resource areas, areas constrained by the Mather overflight zone, sites for additional employment opportunities, and desirable locations for retail development (City of Rancho Cordova 2006). As the name suggests, the densities, land uses, and boundaries are intended to be conceptual. Final land uses and locations are intended to be determined in conjunction with subsequent mater planning of these areas. Conceptual Land Plans are provided to reflect the City's building block concepts and relevant goals, policies, and actions. Some of the Planning Areas included in the City General Plan are located outside of the Rancho Cordova city limits. Because the City does not have jurisdiction in areas outside of the city limits, they are intended to be considered to be advisory in nature. Planning Areas in the vicinity of the SPA are described below and shown on Exhibit 3.10-1.

- The **Grant Line North Planning Area** is located to the south of the SPA. This area is planned to be developed into five or six neighborhoods to support a population of 16,601 people, and would contain at least one village center that would provide employment opportunities. The Grant Line North Planning Area would include recreational trails and facilities, public transit services, and open space. It consists of 1,846 acres, and would be developed to provide 6,916 dwelling units and 3,634 jobs.

- The **Jackson Planning Area**, located southwest of the SPA, is outside of the existing city limits. The conceptual plan includes residential, commercial, office, and light industrial uses over 8,602 acres. The planning area contains floodplains, creeks, vernal pools, and open space, and would be bordered by surface mining and heavy industrial uses. The area is expected to support a population of 15,457 people within 5,806 dwelling units, and provide 10,753 jobs.

- The **Mather Planning Area** is located northeast of the SPA, outside of the existing city limits. Consisting of 6,306 acres, this area is planned to accommodate 1,982 dwelling units to support a population of 5,175 people, and provide 15,841 employment opportunities. The majority of the Mather Planning Area would remain undeveloped, and approximately 450 acres would be used as the Legionaries of Christ College. Areas north of Kiefer Boulevard would be developed as residential, office, and commercial uses.

- The 7,353-acre **East Planning Area** is outside of the existing city limits, northwest of the SPA. This area is planned for residential, office, parks, and open space. Nine neighborhoods and an employment center are anticipated to be developed with 10,390 dwelling units for a population of 27,781 people and provide 5,644 jobs.

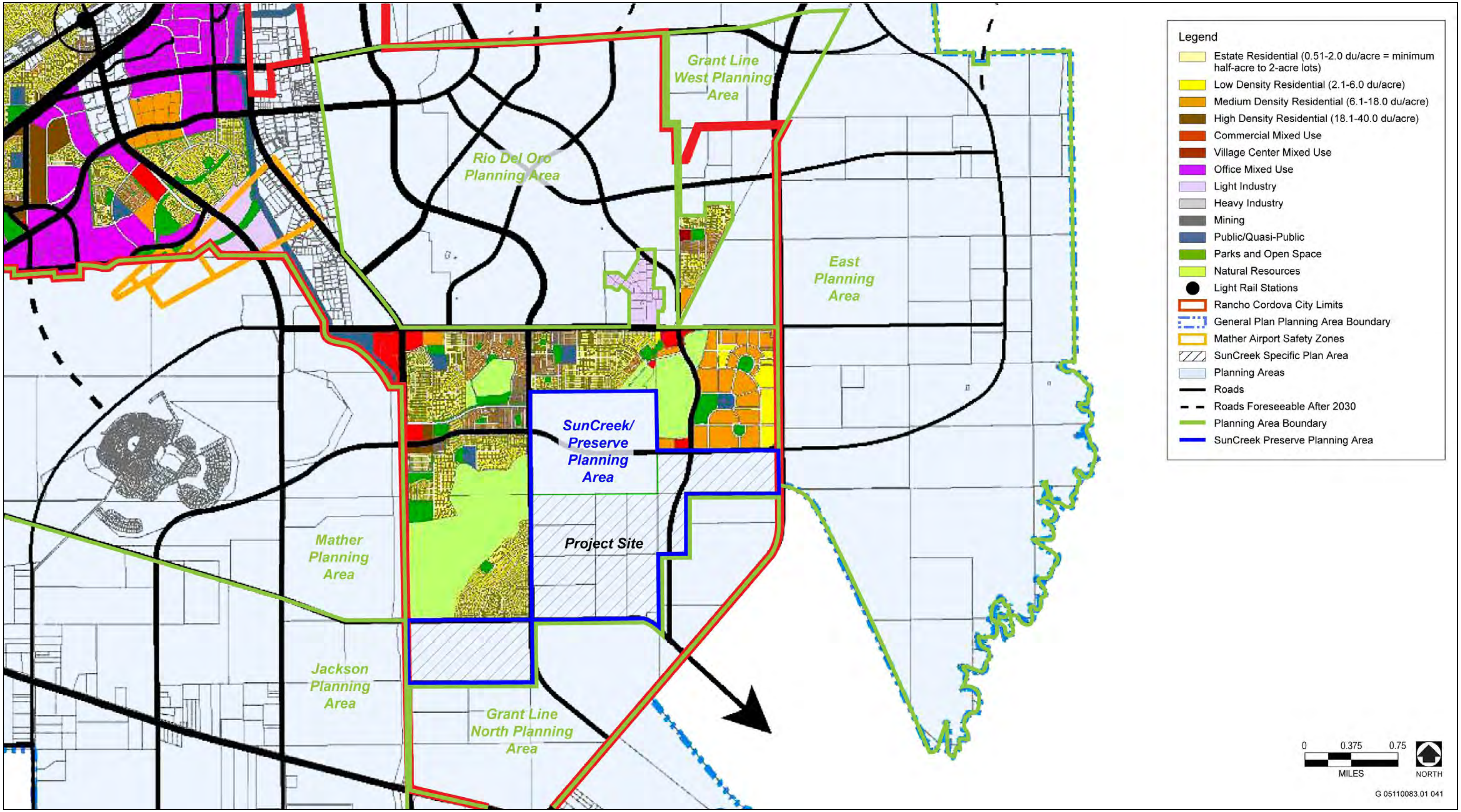
- The **Rio del Oro Planning Area** is located north of the SPA within the city limits. This area consists of 3,828 acres, and based on the approved Rio del Oro Specific Plan, would result in 31,671 new residents; 11,601 dwelling units located in mainly in the northeast, east, and southeast area of the planning area; and a village center, local town center, regional town center, and business and industrial parks that would provide 18,318 jobs.

These five Planning Areas adjacent to the SPA would account for development of 27,935 acres of land, would result in an estimated 36,460 new dwelling units, would support an estimated population of 96,685, and would generate approximately 54,190 employment opportunities.

AGRICULTURAL AND FORESTLAND RESOURCES

Agricultural Resources

Important Farmland is defined under the State CEQA Guidelines as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland (see Section 3.10.2, "Regulatory Framework," for further discussion). The Sacramento County Important Farmland map, published by the California Department of Conservation's (DOC's)



Source: City of Rancho Cordova 2006, Adapted by AECOM in 2010

Rancho Cordova General Plan Planning Areas **Exhibit 3.10-1**

Division of Land Resource Protection, designates 1,240 acres of the SPA as Grazing Land and 12.8 acres as Farmland of Local Importance (DOC 2008a). Therefore, the SPA does not include any agricultural land designated as Important Farmland as defined by State CEQA Guidelines.

Small areas of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance are located south and southeast of the SPA within the Arboretum Specific Plan. In addition, areas of Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance are located southwest of the SPA within the Jackson Planning Area and in areas south of Florin Road (Exhibit 3.10-2).

Williamson Act Contracts

The California Land Conservation Act of 1965, also known as the Williamson Act, is designed to preserve agriculture and open-space lands by discouraging their premature and unnecessary conversion to urban uses. The act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open-space use. In return, landowners receive property tax assessments that are much lower than normal because they are based on farming and open-space uses as opposed to full market value. (DOC 2008b.) None of the land at the SPA is held under Williamson Act contracts (Exhibit 3.10-2). Lands northeast of the SPA within the East Planning Area are under active Williamson Act contracts. Lands southwest of the SPA within the Jackson Planning Area and south of Florin Road include lands under existing Williamson Act contracts and contracts that are in the process of nonrenewal.

Forestland Resources

Forestland, as defined in PRC Section 12220(g) is land that can support 10% native tree cover of any species—including hardwoods—under natural conditions, and that allows for management of one or more forest resources—including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation—and other public benefits. The SPA does not contain 10% native tree cover that would be classified as forestland under PRC Section 12220(g).

3.10.2 REGULATORY FRAMEWORK

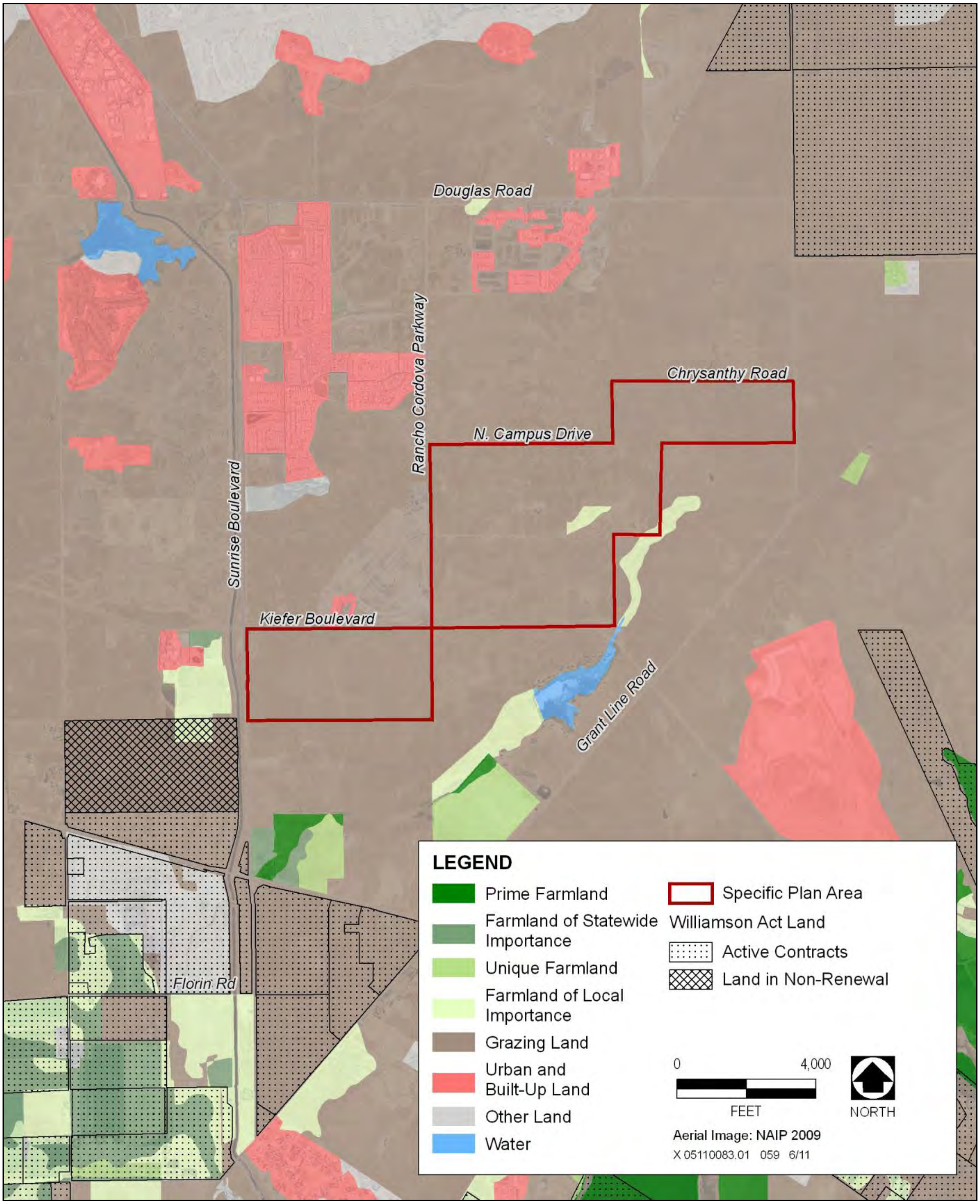
FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

There are no Federal plans, policies, regulations, or laws related to land use planning that are applicable to the Proposed Project or alternatives under consideration.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

State Planning and Zoning Laws

California Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of a city or county and of any land outside its boundaries that, in the city's or county's judgment, bears relation to its planning. The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city's or county's vision for the area. The general plan is a long-range document that typically addresses the physical character of an area over a 20-year period. Finally, although the general plan serves as a blueprint for future development and identifies the overall vision for the planning area, it remains general enough to allow for flexibility in the approach taken to achieve the plan's goals.



Sources: DOC Farmland Mitigation and Monitoring Program 2008a; DOC 2009, Adapted by AECOM in 2011

Agricultural Land and Williamson Act Contracts **Exhibit 3.10-2**

The State Zoning Law (California Government Code Section 65800 et seq.) establishes that zoning ordinances, which are laws that define allowable land uses within a specific district, are required to be consistent with the general plan and any applicable specific plans. When amendments to the general plan are made, corresponding changes in the zoning ordinance may be required within a reasonable time to ensure that the land uses designated in the general plan would also be allowable by the zoning ordinance (California Government Code Section 65860[c]).

A specific plan is another planning device that governs a smaller land area than the general plan, but must be consistent with the overarching general plan. Specifically, it implements the general plan in a particular geographic area. (California Government Code, Section 65450.) Generally, it describes the distribution, location, and extent of the land uses and the associated infrastructure, as well as standards governing future development. The specific plan must include a statement of the relationship between it and the general plan. (California Government Code, Section 65451, subd. [b].) An agency's conclusion that a specific plan is consistent with its general plan "carries a strong presumption of regularity." (*Napa Citizens for Honest Government v. County of Napa Board of Supervisors* [2001] 91 Cal.App.4th 342, 357.)

California Important Farmland Inventory System and Farmland Mitigation and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) was established by the State of California in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the U.S. Soil Conservation Service (now called the Natural Resources Conservation Service [NRCS] of the U.S. Department of Agriculture). The intent of the U.S. Soil Conservation Service was to produce agricultural-resource maps based on soil quality and land use across the nation. The DOC sponsors the FMMP and is also responsible for establishing agricultural easements in accordance with California Public Resources Code Sections 10250–10255.

As part of the nationwide agricultural-land-use mapping effort, the U.S. Soil Conservation Service/NRCS developed a series of definitions known as Land Inventory and Monitoring (LIM) criteria. The LIM criteria classify the land's suitability for agricultural production. Suitability includes both the physical and chemical characteristics of soils as well as the actual land use. Important Farmland maps are derived from the NRCS (formerly U.S. Soil Conservation Service) soil survey maps using the LIM criteria and are available by county. Important Farmland maps classify land into one of eight categories, which are defined as follows (DOC 2007):

- **Prime Farmland**—Land that has the best combination of features for the production of agricultural crops.
- **Farmland of Statewide Importance**—Land other than Prime Farmland that has a good combination of physical and chemical features for the production of agricultural crops.
- **Unique Farmland—**Land of lesser quality soils used for the production of the state's leading agricultural cash crops.
- **Farmland of Local Importance—**Land that is of importance to the local agricultural economy, as defined by each county's local advisory committee and adopted by its board of supervisors.
- **Grazing Land**—Land with existing vegetation that is suitable for grazing.
- **Urban and Built-up Lands—**Land occupied by structures with a density of at least one dwelling unit per 1.5 acres.
- **Land Committed to Nonagricultural Use—**Vacant areas; existing lands that have a permanent commitment to development but have an existing land use of agricultural or grazing lands.
- **Other Lands**—Land that does not meet the criteria of the remaining categories.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Sacramento Area Council of Governments' Sacramento Region Blueprint

The Sacramento Area Council of Governments (SACOG) is a regional organization that provides a variety of planning functions over its six-county region, which includes Sacramento, Yolo, Placer, Sutter, Yuba, and El Dorado Counties. SACOG's primary functions are to provide transportation planning and funding for the region and to study and support resolutions of regional issues. In 2002, SACOG initiated what is now known as the Sacramento Region Blueprint (Blueprint) process after computer modeling of the region showed that current growth patterns and transportation investment priorities would result in significant increases in congestion over the next 50 years, as well as significant consumption of privately held natural and agricultural land. The goal of the process was to determine whether alternatives to current and planned transportation and land use patterns could be established to improve the region's long-term travel patterns and air quality, as well as retain substantially more open space. The Blueprint is the product of a 3-year public-involvement effort and is intended to guide land use and transportation choices over the next 50 years. During this 50-year period the region's population is projected to grow from 2 million to more than 3.8 million, jobs are projected to increase from 921,000 to 1.9 million, and housing units are projected to increase from 713,000 to 1.5 million.

The starting point for the Blueprint process was the "Base Case Scenario," which shows how the region would develop through the year 2050 if growth patterns of the recent past continue. Under the Base Case Scenario, growth would continue outward into largely rural areas and on the fringes of current development. The model predicted that the average resident living in a version of a future typical of the Base Case Scenario in 2050 would probably live in a single-family house on a fairly large lot in a subdivision with similar houses. This resident would commute a longer distance to work than is typical today; trips to work and commercial areas would be lengthy and slow because of significant increases in congestion.

In December 2004, the SACOG Board of Directors adopted the Preferred Blueprint Scenario, a vision for growth that promotes compact, mixed-use development and more transit choices as an alternative to low-density development. It includes a greater range of housing products, reinvestment in already developed areas, protection of natural-resource areas from urbanization, and more transportation choices. Residents living in a future developed area consistent with the Preferred Blueprint Scenario in 2050 would probably live in a home on a smaller lot, in a neighborhood with some larger houses and some attached row houses, apartments, and condominiums. Residents would drive to work, but the trip would be shorter than presently, and the time needed to get there would be about the same as it is now. It is anticipated that residents may sometimes use public transportation (i.e., train or bus). Most of their shopping and entertainment trips would still be via the automobile, but the distances would be shorter. Some of these shopping trips might be via walking or biking down the block a short distance to a village or town center that contains neighborhood stores with housing units built on top of them, and a small park or plaza.

The Sacramento Region Blueprint depicts a way for the region to grow through the year 2050 generally consistent with seven principles of "Smart Growth." These principles are summarized below and include a comparison of development projected under Base Case Scenario to development projected under the Preferred Blueprint Scenario. (SACOG and Valley Vision 2004b.)

- **Transportation Choices:** Developments should be designed to encourage people to sometimes walk, ride bicycles, ride the bus, ride light rail, take the train, or carpool. Use of Blueprint growth concepts for land use and right-of-way design would encourage use of these modes of travel and the remaining auto trips would be, on average, shorter. In the Base Case, 2% of new housing and 5% of new jobs would be located within walking distance of 15-minute bus or train service, the number of vehicle miles traveled (VMT) per day per household would be 34.9 miles, and the total time devoted to travel per household per day would be 81 minutes. The Blueprint Scenario reduces the number of trips taken by car by about 10%. These trips are shifted to transit, walking, or biking. In the Blueprint Scenario, 38% of new homes and 41% of new jobs would be located within walking distance of 15-minute bus or train service, the number of VMT per day per household would be 47.2 miles, and the total time devoted to travel per household per day would be 67 minutes. With the Blueprint Scenario, per capita, there would be 14% less carbon dioxide and particulates produced by car exhaust compared to the Base Case.

- **Mixed-Use Developments:** Building homes and shops, entertainment, office, and light industrial uses near each other can encourage active, vital neighborhoods. This mixture of uses can be either in a vertical arrangement (mixed in one building) or horizontal (with a combination of uses in close proximity). These types of projects function as local activity centers where people would tend to walk or bike to destinations. Separated land uses, on the other hand, lead to the need to travel more by auto because of the distance between uses. Under the Base Case scenario, 26% of people would live in communities with a good, or balanced, mix of land uses by 2050. In the Blueprint Scenario, 53% of people would live in balanced communities.

- **Compact Development:** Creating environments that are more compactly built and use space in an efficient but aesthetic manner can encourage more walking, biking, and public-transit use, and shorten auto trips. Under the Base Case, by 2050, new development would require the consumption of an additional 661 square miles of land. Under the Blueprint Scenario, 304 square miles of new land would be required for new development.

- **Housing Choice and Diversity:** Providing a variety of places where people can live—apartments, condominiums, townhouses, and single-family detached homes on varying lot sizes—creates opportunities for the variety of people who need them: families, singles, seniors, and people with special needs. This issue is of special concern for people with very low, low, and moderate incomes. By providing a diversity of housing options, more people would have a choice.

- **Use of Existing Assets:** In urbanized areas, development on infill or vacant lands, intensification of the use of underutilized parcels, or redevelopment can make better use of existing public infrastructure. This can also include rehabilitation and reuse of historic buildings, denser clustering of buildings in suburban office parks, and joint use of existing public facilities such as schools and parking garages. Under the Base Case Scenario, all new development would be on vacant land. Under the Blueprint Scenario, it is suggested that 13% of all new housing and 10% of all new jobs would occur through reinvestment.

- **Quality Design:** The design details of any land use development—such as the relationship to the street, setbacks, placement of garages, sidewalks, landscaping, the aesthetics of building design, and the design of the public rights-of-way—are factors that can influence the attractiveness of living in a compact development and facilitate the ease of walking and biking to work or neighborhood services. Good site and architectural design is an important factor in creating a sense of community and a sense of place. Under the Base Case, 34% of people would live in pedestrian-friendly neighborhoods. Under the Blueprint Scenario, in 2050, pedestrian-friendly neighborhoods would rise to 69%.

- **Natural Resources Conservation:** This principle encourages the incorporation of public-use open space (such as parks, town squares, trails, and greenbelts) within development projects, above state requirements; it also encourages wildlife and plant habitat preservation, agricultural preservation, and promotion of environmentally friendly practices such as energy efficient design, water conservation and stormwater management, and planting of shade trees. Under the Base Case, 166 square miles of agricultural land would be converted into urban uses. Under the Blueprint Scenario, 102 square miles of agricultural land would be converted to urban uses. When the Preferred Blueprint Scenario was developed, the authors included a calculated, predetermined "preservation factor" that was intended to account for a certain amount of land that could be set aside in the future to preserve natural resources. However, the Preferred Blueprint Scenario did not attempt to map specific areas that could potentially be set aside as preserves. The only "preserve" areas that were mapped were those already designated as such that were in existence at the time the Preferred Blueprint Scenario was created.

Under smart growth principles, areas that are planned for development are developed at higher densities. Although these higher densities may result in greater on-site impacts on biological, cultural, open space, and agricultural resources, the overall area of disturbance within the region is reduced in the long term as development is concentrated in particular locations. Sacramento County has experienced demographic pressure which has reflected an increasing statewide population and intrastate migration from the San Francisco Bay Area, and the City of Rancho Cordova is interested in furthering its goals and objectives of providing a mix of housing and new jobs to its residents. Smart growth principles therefore suggest that developing the site with a higher density use while avoiding wetland areas and other environmental resources would focus market demand for development into an area near existing development, infrastructure, and services.

The Preferred Blueprint Scenario predicts long-term environmental benefits from undertaking a realistic long-term planning process; these benefits are intended to minimize the extent of the inevitable physical expansion of the overall regional urban areas. In summary, if the Preferred Blueprint Scenario were followed, it would result in more mixed-use communities; provide a greater number of small-lot, single-family detached homes; develop a greater number of attached homes; reinvest in existing business and residential areas; and create more pedestrian-friendly neighborhoods. The results of implementing these principles would be the protection of natural resources (because less land would be required for urban uses) and less agricultural land conversion. In addition, the Preferred Blueprint Scenario predicts less time devoted to travel, fewer car trips, and fewer miles traveled to work and local businesses compared with development under the Base Case. The reduction in traffic would improve air quality in the region by reducing carbon monoxide and particulate matter produced by car exhaust.

The Blueprint process received broad support from most of its member agencies. The Blueprint is advisory and therefore does not establish land use restrictions for the City. SACOG has no land use authority. Although it is only advisory, the Blueprint is the most authoritative policy guidance in the Sacramento region for long-term regional land use and transportation planning. A number of jurisdictions either are adopting the Blueprint concepts or are considering and encouraging projects consistent with the Blueprint. Further, the land uses in the City General Plan generally reflect the types and intensity of land uses shown in the Preferred Blueprint Scenario, which envisions relatively higher overall residential densities than currently in place.

The SACOG Blueprint Preferred Scenario anticipates an additional 112,000 households and 144,000 jobs in Rancho Cordova between 2000 and 2050. The Blueprint assumes Rancho Cordova would have a population of over 332,000 people by 2050 and a fairly even mixture of jobs and housing and this growth would occur through development on underutilized lands along and near Folsom Boulevard and lands inside the current Urban Services Boundary. Housing is expected to be primarily single-family detached homes plus multi-family units (attached rowhouses, townhomes, condominiums, and apartments) to ensure housing for the growing population and work force. (SACOG and Valley Vision 2004a.)

Proposed South Sacramento County Habitat Conservation Plan

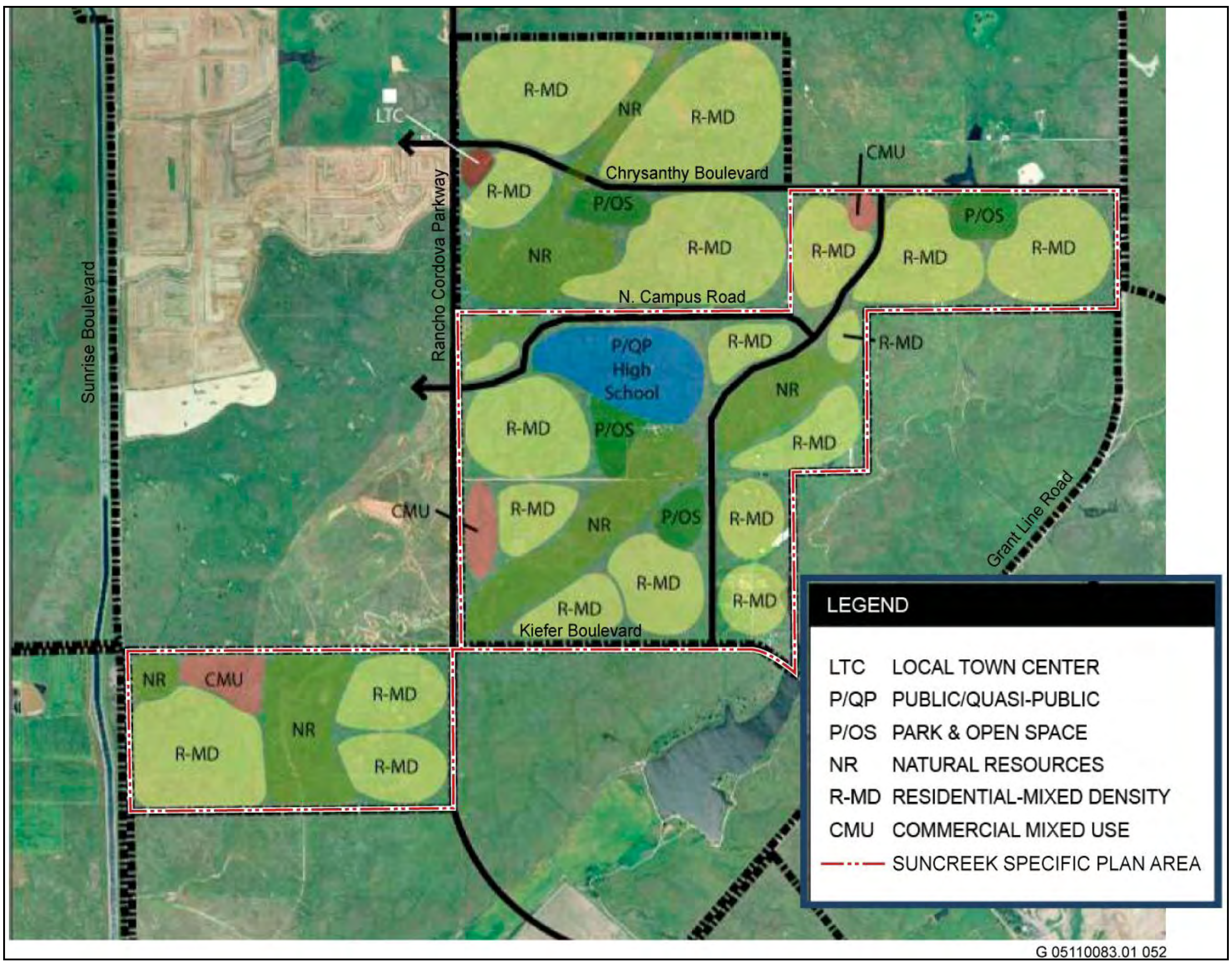
The SPA is located within the proposed South Sacramento County Habitat Conservation Plan (SSCHCP) area. The SSCHCP is intended to provide a regional approach to issues related to urban development habitat conservation, agricultural production and open space planning. The SSCHCP would provide strategies to conserve habitat for nine special-status plants and 42 special-status wildlife species. If adopted, it would serve as a multispecies, multihabitat conservation plan addressing the biological impacts of future urban development within the southern portion of Sacramento County, including the cities of Rancho Cordova, Elk Grove, and Galt, and the under the jurisdictional boundaries of the Sacramento County Water Agency and Sacramento County Regional Sanitation District.

To mitigate impacts, land developers that convert habitat within the urban development area would pay a defined per-acre fee, which would be used to protect, restore, maintain, and monitor habitat. The process for developing the SSCHCP was initiated in 1992. The SSCHCP is currently undergoing environmental review and the best-case estimates for completion and implementation is late 2011-early 2012 (McCormick, pers. comm., 2010). See Section 3.3, “Biological Resources,” for further discussion and analysis related to the SSCHCP.

City of Rancho Cordova General Plan

The *City of Rancho Cordova General Plan* (2006) establishes a land use development pattern that would consist of a series of walkable neighborhoods, villages, and districts. The City envisions that development would provide a mix of housing, jobs, commercial activities and services that would be connected through a series of streets and contiguous open space areas. The City General Plan is intended to reinvent the City of Rancho Cordova as a regional destination, providing a full range of retail services and entertainment venues (Rancho Cordova 2006).

Planning Areas (areas that are described in the City General Plan Land Use Element and designated in the Land Use Map) in the vicinity of the SPA are described above and shown in Exhibit 3.10-1. The SPA is identified in the City General Plan Land Use Element as part of the SunCreek/Preserve Planning Area. As shown in Exhibit 3.10-3, the City's Conceptual Land Plan for the SPA consists of the following land use designations: Public/Quasi-Public (P/QP), Park & Open Space (P/OS), Natural Resources (NR), Residential-Mixed Density (R-MD), and Commercial Mixed Use (CMU). Table 3.10-1 provides the existing Conceptual Land Plan definitions, compatible uses, and zoning as defined by the City General Plan for the SPA. Table 3.10-2 presents the proposed SunCreek Specific Plan land use designations and zoning. As described in Chapter 2, "Alternatives," the project would require a General Plan Amendment to implement the proposed approximately 60-acre Local Town Center. No general plan policy changes are proposed.



Source: City of Rancho Cordova 2006

SunCreek/Preserve Planning Area Conceptual Land Plan **Exhibit 3.10-3**

Table 3.10-1
Existing SunCreek Planning Area Conceptual[1] Land Use Designations

Land Use Designation	Compatible Zoning	Permitted Uses
Public/Quasi-Public	P/QP	A variety of Public/Quasi-Public uses, including: civic buildings, schools, colleges, religious institutions, hospitals, museums, and cemeteries.
Park and Open Space	P/OS	Active and passive recreational activities, such as parks, lakes, golf courses, trails, detention basins, and creeks.
Natural Resources	NR	Natural habitat that contains no urban development.
Residential-Mixed Density	R-MD	Typical neighborhood development, consisting of a range of densities.
Commercial Mixed Use	CMU	Commercial uses combined with office and/or residential uses. These areas may also include public/quasi-public uses.

Notes:
[1] As the name suggests, the City General Plan states that the densities, land uses, and boundaries are intended to be conceptual and are provided to reflect the City's Building Block concepts and relevant goals, policies, and actions. Final land uses and locations are intended to be determined in conjunction with subsequent master planning of these areas.
Source: City of Rancho Cordova 2006

Table 3.10-2
SunCreek Specific Plan Proposed Land Use Designations and Zoning

Proposed Land Use Designation	Proposed Zoning	Specific Plan Definition	Permitted Uses
Public/Quasi Public	Community Services	Provides for a variety of public and other land uses, including land owned by the City and other public agencies. All public/quasi-public uses, including schools, would have an underlying Medium Density Residential land use designation and would apply if the school district determines a proposed school and/or park site is not needed or if the site must be adjusted in size or configuration.	Churches, schools, parks, private schools, public utilities, libraries, fire stations, and detention basins.
Parks and Open Space	P/OS	Provides for both active and passive recreational activities.	Parks, paseos, open space, resource preservation, detention basins
Natural Resources (NR)	NR	Provides for natural resource preservation areas dedicated to protecting Federally-listed endangered and threatened species habitat.	Resource preservation and detention basins.
Low Density Residential	LDR	Densities of 2.1–6 du/acre. Provides for single-family residential development and would allow for flexibility in selecting dwelling unit types and parcel configurations to suit particular site conditions and housing needs.	Single-family dwellings, duplex and halfplex dwellings, and all public/quasi-public land uses.
Medium Density Residential	MDR	Densities of 6.1–12 du/acre. Provides for a mix of single-family and multifamily housing types and would allow for flexibility in selecting dwelling unit types and parcel configurations to suit particular site conditions and housing needs.	Small-lot single-family dwellings, patio homes, paseo homes, duplexes, halfplexes, live/work dwellings, neighborhood work centers, and all public/quasi-public land uses.

Table 3.10-2
SunCreek Specific Plan Proposed Land Use Designations and Zoning

Compact Medium Density Residential	CMDR	Densities of 12.1–18 du/acre. Provides for multifamily dwelling units that would result in compact urban forms. Dwelling units within this land use designation would often be in linear and share common walls or low low-scale apartments.	Townhomes, garden apartments, small-lot single-family dwellings, patio homes, paseo homes, duplexes, halfplexes, live/work dwellings, neighborhood work centers, and all public/quasi-public land uses.
High Density Residential	HDR	Densities of 18.1–40 du/acre. Provides for multifamily dwelling units that are located adjacent to Village Commercial or Local Town Center sites.	Townhomes, apartments, live/work dwellings, neighborhood work centers, and all public/quasi-public land uses.
Village Commercial	VC	Provides retail services, restaurant, entertainment and office employment uses as described in the City's building block concept. Village Commercial serves the daily shopping needs of residents and may include small- and medium-size grocery stores, drug stores, restaurants, banks, and other similar uses. Within a mixed use development plan, the sites may be integrated vertically with mixed uses above one another, such as residential or office uses over a commercial use. Sites may also be mixed horizontally with the uses side-by-side, but linked together through common walkways, plazas and parking areas. Each site is located along a major street and could be a transit oriented development served by bus, bus rapid transit, a local shuttle, or all three. The sites are adjacent to high density residential and are served by the pedestrian and bike trail network that connects the sites to the surrounding neighborhoods. Each of the sites has within it or nearby a small neighborhood scale park.	Retail and Service Commercial, Offices, Children and Senior Day Care Centers, Recreation Centers, Churches, Schools, Parks, Private Schools, Public Utilities, Libraries, Fire Stations
Local Town Center	LTC	Provides for retail services, restaurant, and entertainment uses within a district as described in the City's building block concept. Development would be pedestrian friendly with gathering places for both daytime and nighttime activities.	General retail services, restaurants, commercial and office uses, entertainment, public/quasi-public uses, and indoor and outdoor recreational facilities.
NA	AG-80[a] (Agricultural, 80-acre minimum)		Crop production, animal keep, and commercial agricultural-related uses.

Notes: du/ac = dwelling units per acre; NA = not applicable.

[a] The Luxori and Grantline 220 property owners are not currently participating in the EIR/EIS process, and are not seeking approval of development agreements, large-lot tentative maps, or zoning amendments at this time. Therefore, these parcels would remain zoned as AG-80.

Sources: Wade Associates 2012 and City of Rancho Cordova 2006

City of Rancho Cordova Zoning Code

The current City of Rancho Cordova zoning code became effective on February 20, 2009. It is specifically intended to:

- Serve as the principle tool for implementing the City's General Plan in a manner that protects the health, safety, and welfare of the citizens of Rancho Cordova.
- Facilitate prompt review of development proposals and provide for public information, review, and comment on development proposals that may have a significant impact on the community.
- Create a comprehensive and stable pattern of land uses to help ensure the provision of adequate water, sewerage, transportation, drainage, parks, open space, and other public facilities.
- Conserve and protect the City's natural resources and features such as creeks, significant trees, such as Heritage Oaks, historic, and environmental resources.
- Create a complete multi-modal transportation network that promotes pedestrian-oriented development, safe and effective traffic circulation, and adequate facilities for all transportation modes (e.g., walking, bicycling, driving, and using transit).
- Require that permitted uses and development designs provide reasonable protection from fire, flood, landslide, erosion, or other man-made and natural hazards.
- Ensure compatibility between residential and non-residential development and facilitate the development of compatible mixed-use developments.

The project requires an amendment to the City General Plan zoning designations at the SPA, from AG-80 and AG-20 to a variety of zoning designations that would allow for various types of urban development, as shown in Exhibit 2-3 in Chapter 2, "Alternatives." The proposed zoning designations are also listed in Table 3.10-2.

As described previously in Chapter 1, "Introduction," and Chapter 2, "Alternatives," although the Specific Plan includes a proposal for development on the Luxori and Grantline 220 parcels, those property owners are not currently participating in the EIR/EIS process, and are not seeking approval of development agreements, large-lot tentative maps, or zoning amendments at this time.

City of Rancho Cordova General Plan Goals and Policies

Goals and policies from the *City of Rancho Cordova General Plan* (City General Plan 2006) relating to land use and agricultural resources that are applicable to the Proposed Project and alternatives under consideration are listed in Appendix K.

3.10.3 Environmental Consequences and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Project or alternatives under consideration were determined to result in a significant impact related to land use or agricultural resources if they would do any of the following:

- physically divide an established community;

- conflict with any applicable land use plan, policy, or regulation of an agency (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;

- conflict with any applicable habitat conservation plan or natural community conservation plan;

- convert Important Farmland (i.e., Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use;

- conflict with existing zoning for agricultural use or a Williamson Act contract;

- conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220[g]), timberland (as defined in PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g]);

- result in the loss of forest land or conversion of forestland to non-forest use; or

- involve other changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland to nonagricultural use or conversion of forestland to non-forest use.

Issues related to conflicts with an applicable adopted habitat conservation plan and potential direct and/or indirect impacts associated with such conflicts are addressed in Section 3.3, "Biological Resources."

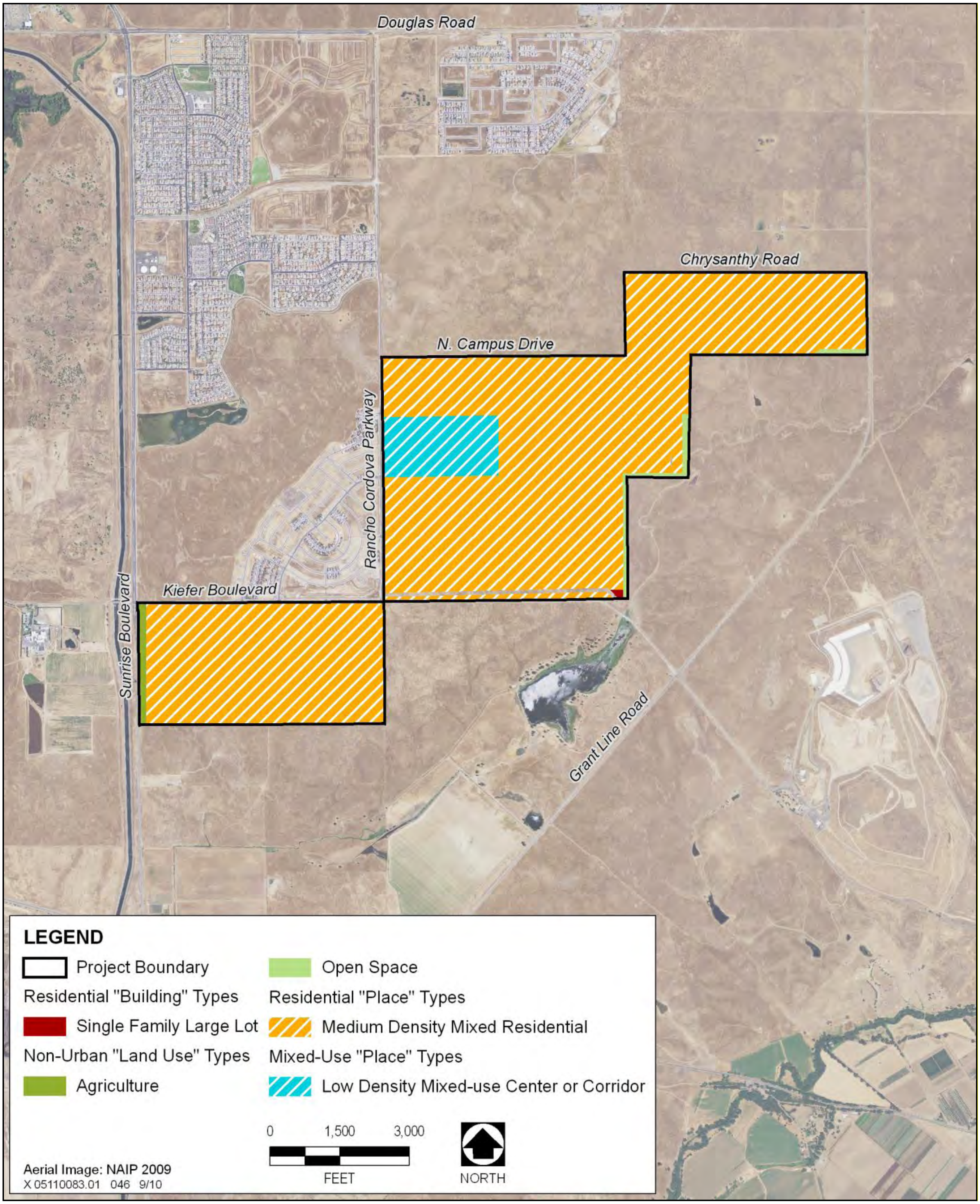
ANALYSIS METHODOLOGY

Evaluation of potential land use impacts of the Proposed Project and the alternatives under consideration were based on a review of planning documents pertaining to the SPA and vicinity, including the City General Plan (2006) and zoning code and the SACOG Blueprint. In addition, the DOC Important Farmland map and Williamson Act contract map for Sacramento County were used to evaluate the significance of the lands in the SPA.

The land use planning and zoning authority of local jurisdictions in California is set forth in the state's planning laws. The project is located within the City of Rancho Cordova, and therefore the City has planning jurisdiction over the SPA. Any inconsistencies between the City land use designations and zoning code and the project's proposed land use designations and zoning would be a land use regulation issue rather than a physical environmental consequence of project implementation and would not necessarily be considered a significant impact under CEQA or NEPA in and of itself.

Presently, the SPA is designated as part of the SunCreek/Preserve Planning Area under the Rancho Cordova General Plan. Consistent with the City General Plan and the principles of Smart Growth, the SunCreek Specific Plan contains a mix of low, medium, and high density residential units, local and community parks, neighborhood and village center, schools, and other public/quasi-public uses. The proposed SunCreek Specific Plan zoning is intended to be consistent with these land uses with the exception of proposed zoning on the Grantline 220 or Luxori parcels (non-participating landowners), which would be retained in the existing agricultural zoning until such time as those landowners came forth with specific development proposals and undergo future site-specific environmental review.

The Blueprint identifies the SPA as a future planned community accommodating the long-term needs of Rancho Cordova and contributing to the Sacramento region. As shown in Exhibit 3.10-4, the Blueprint Vision generally consists of medium and low density residential housing over nearly the entire SPA, does not include large areas of non-urban land uses, and only a small amount of open space and agriculture. The SACOG Blueprint designated the SPA as Single Family Large Lot, Medium-Density Mixed Residential, Low-Density Mixed-Use Center or Corridor,



Source: SACOG 2004a

SACOG Blueprint Land Use Designations for the SPA **Exhibit 3.10-4**

Open Space, and Agriculture. (Note that the SACOG Blueprint is a regional plan and does not precisely correspond with the SPA boundary. As shown Exhibit 3.10-4, land use designations along Kiefer Boulevard do not correspond to the aerial image; as a result, it is reasonable to assume that the Single Family Large Lot SACOG land use designation is outside of the SPA project boundary.) SACOG describes the remaining land use designations in the SPA as follows:

- **Medium-Density Mixed Residential:** emphasis of residential land uses with approximately 30% of the site small-lot single-family dwelling units; 48% of the site single-family large-lot dwelling units; 12% of the site multifamily attached units such as apartments, condominiums, townhouses, and residential mixed use (two-to four-story buildings); and 10% of the site retail land uses.

- **Low-Density Mixed-Use Center or Corridor:** emphasis of residential land uses with approximately 50% of the site small-lot single-family dwelling units; 35% of the site multifamily attached units such as apartments, condominiums, townhouses, and residential mixed use (one-to three-story buildings); and 15% of the site retail land uses.

- **Open Space:** passive-use areas, no development allowed.

- **Agriculture:** continuation of agricultural activities, no urban development allowed.

Although it is only advisory, the Sacramento Region Blueprint provides policy guidance in the Sacramento region for long-term regional land use and transportation planning that would potentially result in the protection of additional natural resources (because less land would be required for urban uses), less conversion of agricultural land, and reduction in traffic that would improve air quality in the region. The Blueprint does not establish land use restrictions on any jurisdiction and SACOG has no land use authority. SACOG makes clear that the land use designations presented in the Blueprint Preferred Scenario are conceptual and reflect general land use locations in a local area. Therefore, this EIS/EIR does not evaluate consistency with the SACOG Blueprint as an environmental impact. The potential for the project's consistency with the SACOG Blueprint to result in growth-inducing impacts is discussed in Chapter 4, "Other Statutory Requirements."

ISSUES NOT DISCUSSED FURTHER IN THIS EIR/EIS

Physically Divide an Established Community—The SPA consists of livestock grazing lands and five scattered rural residences. These residences are not formally or informally known as a community. Therefore, implementing the project would not physically divide an established community. For this reason, this issue is not evaluated further in this EIR/EIS.

Conversion of Important Farmland to Nonagricultural Uses— The SPA contains Grazing Land and Farmland of Local Importance, which are not considered Important Farmland under CEQA (California Public Resources Code Section 21060.1 and 21095 and State CEQA Guidelines Appendix G). Furthermore, the City General Plan Policy LU.1.9 only requires protection of (i.e., mitigation for loss of) Prime Farmland, Unique Farmland, or Farmland of Statewide Importance—none of which are present on the SPA. For these reasons, there would be no direct impact related to the conversion of Important Farmland to nonagricultural uses; therefore, this issue is not evaluated further in this EIR/EIS.

Conflict with Existing Zoning for Agricultural Use or a Williamson Act Contract—There are no Williamson Act contracts associated with land within the SPA; therefore, there would be no impact related to conflicts with existing Williamson Act contracts. For this reason, this issue is not evaluated further in this EIR/EIS.

Conflict with Existing Zoning for, or Cause Rezoning of, Forest Land, Timberland, or Timberland Zoned Timberland Production—The is no forestland, timberland, or a timberland production zone within the SPA or that would be rezoned as a result of project implementation; thus, there would be no impact. For these reasons, this issue is not evaluated further in this EIR/EIS.

Result in the Loss of Forestland or Conversion of Forestland to Non-Forest Use— The SPA does not contain 10% native tree cover that would be classified as forestland under PRC Section 12220(g); therefore, there would be no impact related to conversion of forest land to non-forest use. For this reason, this issue is not evaluated further in this EIR/EIS.

As described in Chapter 2, "Alternatives," and discussed earlier in this section, the project would require a General Plan Amendment and zoning changes to implement the proposed approximately 60-acre Local Town Center and the associated urban zoning designations. No general plan or zoning policy changes are proposed. Because there would be no physical/environmental impact associated with the general plan redesignation or zoning actions, the issue is not evaluated further in this EIR/EIS. Any inconsistencies between the project and City General Plan policies are addressed as individual, topic-specific impacts within Sections 3.1 through 3.17 of this EIR/EIS.

IMPACT ANALYSIS

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.10-1	**Potential that the Project would Involve other Changes in the Existing Environment which, due to their Location or Nature, could Result in Conversion of Important Farmland to a Nonagricultural Use.** *Implementation of the project could potentially result in the ultimate conversion of off-site agricultural (i.e., grazing) land to nonagricultural land uses.*

NP

Under the No Project Alternative, there would be no project-related construction. Thus, there would be **no direct** or **indirect** impacts from project-related changes in the environment that could induce conversion of Important Farmland to urban land uses. ***[Lesser]***

NCP, PP, BIM, CS, ID

Important Farmland is defined as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The location of the different types of agricultural land in the vicinity of the SPA are shown on Exhibit 3.10-2. Lands immediately adjacent to the SPA are currently used for and designated by the DOC as livestock "grazing land." Most of the Important Farmland in the project vicinity is located south and southeast of the SPA.

Over time, expansion of urbanizing areas into rural areas can result in future additional conversion of agricultural land to urban land uses. However, urbanization of the area surrounding the SPA has already begun (e.g., Anatolia III), and future development is imminent. As discussed above in the "Affected Environment" and shown in Exhibits 3.10-1 and 3.0-1 (Section 3.0, "Approach and Cumulative Context"), the SPA and surrounding areas to the north, south, and west within the City are either planned for development and/or undergoing environmental review under the City General Plan, development entitlements have been granted, or are in the construction process. As further discussed above, the City of Rancho Cordova General Plan envisions development of urban land uses within the City limits in each of its designated Planning Areas, and therefore considered the conversion of agricultural to urban land uses in its General Plan EIR (2006, incorporated herein by reference). As with the approach taken in this EIR/EIS, Section 4.2, "Agricultural Resources" of the City General Plan EIR indicates that conversion of grazing land to urban uses is not a significant impact, because it does not meet the CEQA definition of "Important Farmland" (California Public Resources Code Section 21060.1 and 21095 and State CEQA Guidelines Appendix G). As stated previously, City General Plan Policy LU.1.9 only requires protection of (i.e., mitigation for loss of) Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. As further discussed in Section 4.2 "Agricultural Resources" of the City General Plan EIR, nearly all of the agricultural land within the existing City limits is composed of grazing land. While there is a small amount of "Important Farmland" on the Arboretum project site immediately south of the SPA, the Arboretum project is already undergoing the EIR/EIS process for a specific plan that would guide the development of urban mixed-uses. Finally, the land to the east of the SPA (under the jurisdiction of Sacramento County), which is also designated by the DOC as "grazing land," is already proposed for urban development as part of the Cordova Hills project, and land southeast of the SPA is already in use by, and proposed for expansion of, Kiefer Landfill. Thus, the potential for the project to result in changes to the physical environment that could cause the conversion of Important Farmland to non-agricultural uses under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives is considered to be a **less-than-significant, indirect** impact. **No direct** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

3.10.4 Residual Significant Impacts

Project-related impacts associated with land use and agricultural resources would be less than significant. Therefore, no residual significant impacts would occur.

3.10.5 Cumulative Impacts

Land Use

The SPA consists of livestock grazing lands, and five existing single-family residences and associated agricultural outbuildings spread throughout the SPA. Issues involving consistency of adopted land use plans or policies and zoning generally do not constitute physical impacts on the environment; furthermore they are site-specific and therefore would not combine to result in cumulative impacts. The determination of significance for impacts related to these issues, as described by Appendix G of the State CEQA Guidelines, is whether a project would conflict with any applicable land use plan or policy adopted for the purpose of avoiding or mitigating environmental impacts. Such a conflict is site-specific; it is addressed on a project-by-project basis. The project's ultimate consistency with adopted local land use plans, policies, and zoning is provided for through a requested amendment to the City of Rancho Cordova General Plan and Zoning Code designations for the SPA. These requested amendments would not result in any physical environmental impacts; therefore, the project would not contribute to a cumulative impact related to consistency with general plan policies or land use designations.

Any land use inconsistencies of future projects, by themselves, are not considered a significant cumulative effect because those are land use regulations, not a physical environmental impact. Implementation of those plans and policies adopted for the purpose of avoiding or mitigating environmental impacts for the project and the related projects could lead to physical environmental impacts, which are considered in the appropriate topical issue areas within Chapter 3 of this EIR/EIS.

The five rural residences are not formally or informally known as a community, and therefore implementing the project would not physically divide a community. Thus, project implementation would not result in a cumulatively considerable incremental contribution to a significant cumulative impact.

Agricultural Resources

The SPA does not contain forest land, timberland, or land zoned for Timberland Production, nor does it contain 10% native tree cover that would be classified as forest land under PRC Section 12220(g). Thus, project implementation would not result in a cumulatively considerable contribution to a significant cumulative impact.

Approximately 187,102 acres of land in Sacramento County was under Williamson Act contracts in 2007. Of these lands, approximately 10,605 acres were in the nonrenewal process. The nonrenewal process is the most common mechanism for termination of Williamson Act contract lands and most Williamson Act contracts are terminated through nonrenewal expiration. In Sacramento County, approximately 406 acres of land under of Williamson Act contracts entered the nonrenewal process, and the amount of contract land terminated through nonrenewal expirations was approximately 524 acres as of 2007 (DOC 2008b). The amount of Williamson Act land terminated through nonrenewal has continued to increase each year as urban development proceeds in the region. Some of the related projects have Williamson Act contracted lands. However, the SPA does not contain land subject to a Williamson Act contract and thus the project would not result in a cumulatively considerable incremental contribution to this significant cumulative impact related to termination of Williamson Act contracts.

Implementation of the project and the related projects would replace existing agricultural uses (primarily designated as “grazing land” by the DOC) with urban uses. As described above, implementation of the project is consistent with the City General Plan’s analysis related to planned conversion of agricultural land within the City limits to urban uses. The Sacramento County Important Farmland map, published by DOC’s Division of Land Resource Protection, designates the SPA as Grazing Land and Farmland of Local Importance. These farmland designations are not considered “Important Farmland” under CEQA (California Public Resources Code Sections 21060.1 and 21095 and State CEQA Guidelines Appendix G). Of the related projects considered in this cumulative analysis (see Section 3.0, “Approach and Cumulative Context”), a few would result in the conversion of “Important Farmland” (i.e., Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) to a non-agricultural use. Because the project does not contain “Important Farmland” it would not result in a cumulatively considerable incremental contribution to a significant cumulative impact.

3.11 NOISE

3.11.1 AFFECTED ENVIRONMENT

ACOUSTIC FUNDAMENTALS

Acoustics is the scientific study that evaluates perception, propagation, absorption, and reflection of sound waves. Sound is a mechanical form of radiant energy, transmitted by a pressure wave through a solid, liquid, or gaseous medium. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise; consequently, the perception of sound is subjective in nature, and can vary substantially from person to person. Common sources of environmental noise and noise levels are presented in Exhibit 3.11-1.

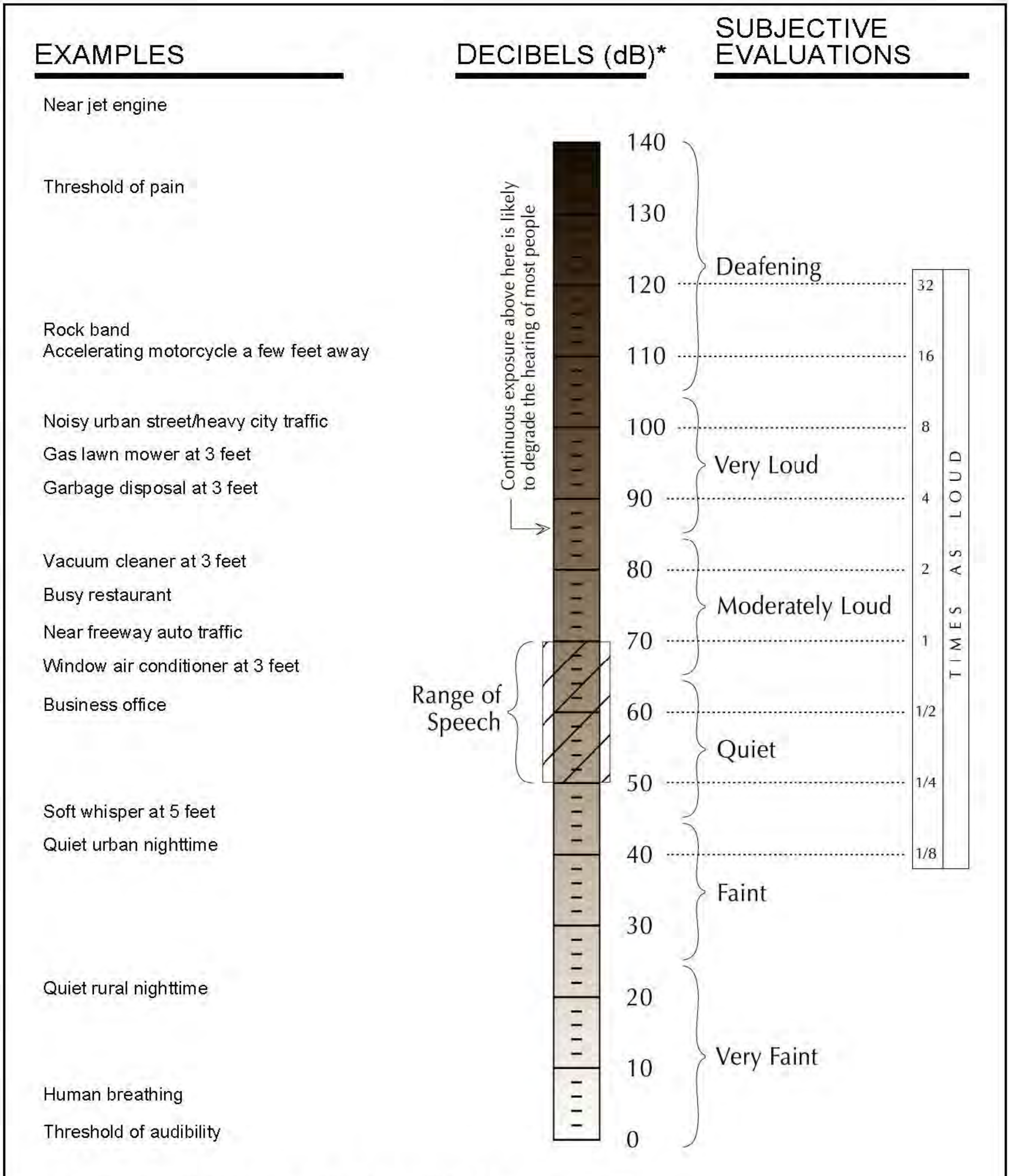
A sound wave is initiated in a medium by a vibrating object (e.g., vocal chords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in hertz (Hz), which is equivalent to one complete cycle per second.

Directly measuring sound pressure fluctuations would require the use of a very large and cumbersome range of numbers. To avoid this and have a more useable numbering system, the decibel (dB) scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two like pressure quantities, with one pressure quantity being a reference sound pressure. For sound pressure in air the standard reference quantity is generally considered to be 20 micropascals, which directly corresponds to the threshold of human hearing. The use of the decibel is a convenient way to handle the million-fold range of sound pressures to which the human ear is sensitive. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly added. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100-fold increase in acoustical energy.

The loudness of sound perceived by the human ear depends primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A through E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels (dBA). For this reason the dBA can be used to predict community response to noise from the environment, including noise from transportation and stationary sources.

Noise can be generated by a number of sources, including mobile sources (transportation noise sources) such as automobiles, trucks, and airplanes and stationary sources (non-transportation noise sources) such as construction sites, machinery, and commercial and industrial operations. As acoustic energy spreads through the atmosphere from the source to the receiver, noise levels attenuate (decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers (e.g., walls, building façades, or berms). Noise generated from mobile sources generally attenuates at a rate of 3 dBA (typical for hard surfaces, such as asphalt) to 4.5 dBA (typical for soft surfaces, such as grasslands) per doubling of distance, depending on the intervening ground type. Stationary noise sources spread with more spherical dispersion patterns that attenuate at a rate of 6 dBA (hard surfaces) to 7.5 dBA (soft surfaces) per doubling of distance.

Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may additionally alter the propagation of noise and affect levels at a receiver. Furthermore, the presence of a large object (e.g., barrier, topographic features, and intervening building façades) between the source and the receptor can provide substantial attenuation of noise levels at the receiver. The amount of noise level reduction or "shielding" provided by a barrier primarily depends on the size of the barrier, the location of the barrier in relation to the



* dB are "average" values as measured on the A-scale of a sound-level meter.
From Concepts in Architectural Acoustics: M. David Egan, McGraw Hill, 1972 and U.S. Department of Housing and Urban Development, Office of Community Planning and Development "The Noise Guidebook."

Source: Data adapted by AECOM in 2010

Typical Noise Levels **Exhibit 3.11-1**

source and receivers, and the frequency spectra of the noise. Natural barriers such as berms, hills, or dense woods, and human-made features such as buildings and walls may be used as noise barriers.

NOISE DESCRIPTORS

The intensity of environmental noise fluctuates over time, and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to describe environmental noise are defined below.

- *L_{max} (Maximum Noise Level):* The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."
- *L_{min} (Minimum Noise Level):* The minimum instantaneous noise level during a specific period of time.
- *L_x (Statistical Descriptor):* The noise level exceeded X% of a specific period of time. For example, L_{50} is the median noise level, or level exceeded 50% of the time.
- *L_{eq} (Equivalent Noise Level):* The average noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the L_{eq}. In noise environments determined by major noise events, such as aircraft overflights, the L_{eq} value is heavily influenced by the magnitude and number of single events that produce the high noise levels.
- *L_{dn} (Day-Night Average Noise Level):* The 24-hour L_{eq} with a 10-dBA "penalty" for noise events that occur during the noise-sensitive hours between 10 p.m. and 7 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours, and this generates a higher reported noise level when determining compliance with noise standards. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- *CNEL (Community Noise Equivalent Level):* The CNEL is similar to the L_{dn} described above, but with an additional 5-dBA "penalty" added to noise events that occur during the noise-sensitive hours between 7 p.m. and 10 p.m., which are typically reserved for relaxation, conversation, reading, and television. When the same 24-hour noise data are used, the reported CNEL is typically approximately 0.5 dBA higher than the L_{dn}.
- *SEL (Sound Exposure Level):* The cumulative exposure to sound energy over a stated period of time.

Community noise is commonly described in terms of the ambient noise level which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level L_{eq} which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, as defined above, and shows very good correlation with community response to noise.

CHARACTERISTICS OF SOUND PROPAGATION AND ATTENUATION

As sound (or noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, depends on surface characteristics, atmospheric conditions, and the presence of physical barriers. The inverse square law describes the attenuation caused by the pattern of sound traveling from the source to the receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance. However, from a line source (e.g., a road), sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA per doubling of distance. The surface characteristics between the source and the receptor may result in additional sound absorption and/or reflection. Atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels.

Furthermore, the presence of a barrier between the source and the receptor may also attenuate noise levels. The actual amount of attenuation depends on the barrier size and frequency of the noise. A noise barrier may be any natural or human-made feature such as a hill, tree, building, wall, or berm (California Department of Transportation [Caltrans] 2009:2-39 through 2-40).

HUMAN RESPONSE TO NOISE

Excessive and chronic exposure to elevated noise levels can result in auditory and non-auditory effects on humans. Auditory effects of noise on people are those related to temporary or permanent hearing loss caused by loud noises. Non-auditory effects of exposure to elevated noise levels are those related to behavioral and physiological effects. The non-auditory behavioral effects of noise on humans are associated primarily with the subjective effects of annoyance, nuisance, and dissatisfaction, which lead to interference with activities such as communications, sleep, and learning. The non-auditory physiological health effects of noise on humans have been the subject of considerable research attempting to discover correlations between exposure to elevated noise levels and health problems, such as hypertension and cardiovascular disease. The mass of research infers that noise-related health issues are predominantly the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to non-auditory health effects remains a subject of considerable research, with no definitive conclusions.

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several non-acoustic factors. The number and effect of these non-acoustic environmental and physical factors vary depending on individual characteristics of the noise environment such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in the noise levels that are attributed to a new noise source, relative to the environment an individual has become accustomed to, the less tolerable the new noise source will be to the new noise source.

With respect to how humans perceive and react to changes in noise levels, a 1-dBA increase is imperceptible, a 3-dBA increase is barely perceptible, a 6-dBA increase is clearly noticeable, and a 10-dBA increase is subjectively perceived as approximately twice as loud (Egan 1988:21). These subjective reactions to changes in noise levels were developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50 dBA to 70 dBA, as this is the usual range of voice and interior noise levels. For these reasons, a noise level increase of 3 dBA or more is typically considered substantial in terms of the degradation of the existing noise environment.

FUNDAMENTAL NOISE CONTROL OPTIONS

Any noise problem may be considered as being composed of three basic elements: noise source, transmission path, and receiver. The appropriate acoustical treatment for a given project considers the nature of the noise source and the sensitivity of the receiver. The problem may be defined in terms of appropriate criteria (L_{dn}, L_{eq}, or L_{max}), location of the sensitive receiver (inside or outside), and time that the noise occurs (daytime or nighttime). Noise control techniques may then be selected to provide an acceptable noise environment for the sensitive receiver while remaining consistent with local aesthetic standards and practical structural and economic limits. Description of potential noise control options are provided below.

Setbacks

Noise exposure may be reduced by increasing the distance between the noise source and the receiving use. Examples of setback areas applicable to development projects can take the form of open space, wetlands, recreational areas (e.g., parks), and storage yards. The available noise attenuation from this technique is limited by the characteristics of the noise source but is generally between 4–6 dBA.

Barriers

Shielding by barriers can be obtained by placing walls, berms, or other structures (e.g., buildings) between the noise source and the receiver. The effectiveness of a barrier depends on the ability to block the line of sight between the source and receiver; effectiveness is improved when sound must travel a longer distance to pass over the barrier than if it were traveling in a straight line from source to receiver. The difference between the distance over a barrier and a straight line between source and receiver is called the "path length difference" and is the basis for calculating barrier noise reduction.

Barrier effectiveness also depends upon the relative heights of the source, barrier, and receiver. In general, barriers are most effective when placed close to either the receiver or the source. An intermediate barrier location yields a smaller path length difference for a given increase in barrier height than does a location closer to either source or receiver.

For maximum effectiveness, barriers must be continuous and airtight along their length and height. To ensure that sound transmission through the barrier is insignificant, barrier mass should be about 4 pounds per square foot, although a lesser mass may be acceptable if the barrier material will still ensure that a substantial amount of transmission loss does not occur. Satisfaction of the above criteria requires substantial and well-fitted barrier materials placed to intercept the line of sight to all substantial noise sources. Earth, in the form of berms or the face of a depressed area, is also an effective barrier material.

There are practical limits to the noise reduction provided by barriers. For vehicle traffic or railroad noise, a noise reduction of between 5–10 dBA may often be reasonably attained. Barriers usually are provided in the form of walls, berms, or berm/wall combinations. The use of an earth berm in lieu of a solid wall may provide up to 3 dBA additional attenuation over that attained by a solid wall alone because of the absorption provided by the earth. Berm/wall combinations offer slightly better acoustical performance than solid walls alone and they are often preferred for aesthetic reasons.

Site Design

Buildings can be placed on a project site to shield other structures or activity areas from intruding noise and prevent an increase in noise levels attributable to surface reflections when accounting for on-site building placement geometry. The use of one building to shield another can substantially reduce a project's overall noise control costs, particularly if the shielding structure is insensitive to noise.

Site design should account for building placement to avoid creating reflecting surfaces that may increase on-site noise levels. For example, two buildings placed at an angle facing a noise source may cause noise levels within that angle to increase by up to 3 dBA. The open end of U-shaped buildings should point away from noise sources for the same reason. Landscaping walls or noise barriers located within a development may inadvertently reflect noise back to a noise-sensitive area unless located carefully and appropriate landscaping materials are utilized. Avoidance of these problems while attaining an aesthetic site design requires close coordination between local agencies, project engineer, architect, and noise consultant.

Noise Reduction by Building Façades

When interior noise levels are of concern in a noisy environment, noise reduction may be obtained through detailed acoustical design of building façades. Standard construction practices provide an interior to exterior noise reduction of 10 to 15 dBA for building façades with doors and windows open and a noise reduction of approximately 25 dBA when doors and windows are closed. Thus, an exterior-to-interior noise reduction of 25 dBA can be obtained by requiring building designs to include adequate ventilation systems that allow windows on a noise-affected facade to remain closed under any weather condition.

Where greater noise reduction is required, acoustical treatment of the building façade becomes necessary. Reducing window surface area of building façades is the most effective control technique followed by providing acoustical glazing (thicker glass or increased air space between panes) in frames with low air infiltration rates, using fixed (non-movable) acoustical glazing, or eliminating windows. Noise transmitted through walls can be reduced by increasing wall mass (using stucco or brick in lieu of wood siding), isolating wall members through the use of double or staggered stud walls, or mounting interior walls on resilient channels. Noise control for exterior doorways can be provided by reducing door area, using solid-core doors, and by acoustically sealing door perimeters with suitable gaskets. Roof treatments can also reduce noise by increasing the mass of plywood sheathing under roofing materials.

Use of Vegetation

Trees and other vegetation are often considered by the public to provide substantial noise attenuation. However, approximately 100 feet of dense foliage (so that no visual path extends through the foliage) is required to achieve 5 dBA attenuation of traffic noise. Thus, the use of vegetation as a noise barrier should not be considered a practical method of noise control unless large tracts of dense foliage are part of the existing landscape.

Vegetation can be used to acoustically “soften” intervening ground between a noise source and a receiver, by increasing ground absorption of sound and thus increasing the attenuation of sound with distance. Planting trees and shrubs also offers aesthetic and psychological value that could reduce adverse public reaction to a noise source by removing the source from view, even though noise levels will be largely unaffected. It should be noted, however, that trees planted on the top of a noise-control berm can actually slightly degrade the acoustical performance of the barrier. This effect can occur when high-frequency sounds are diffracted (bent) by foliage and directed downward over a barrier. Typically, evergreen trees acoustically perform better than broad leaf foliage, which could act as a reflective surface.

VIBRATION

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, or landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, or construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery) or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (Federal Transit Administration [FTA] 2006:**7**-1–7-8, Caltrans 2004:5-7). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as vibration decibels (VdB). The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

Typical outdoor sources of perceptible groundborne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, effects may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in damage to structural components. The range of vibration that is relevant to this analysis occurs from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings (FTA 2006:8-1 through 8-8).

EXISTING NOISE ENVIRONMENT

Project Location

The SPA consists of approximately 1,253 acres in southern Rancho Cordova. Surrounding land uses generally include open space and agricultural uses to the south and east; Kiefer Landfill located across Grant Line Road to the southeast at 12701 Kiefer Boulevard; and the Sacramento Rendering Company located across Sunrise Boulevard to the southwest at 11350 Kiefer Boulevard. Residential land uses are currently being developed and have been developed to the west and north of the project site. Specifically, the Anatolia development is under construction and is situated to the north adjacent to the SPA, north of Kiefer Road and west of Rancho Cordova Parkway. The Ranch at Sunridge development is located adjacent to and north of the proposed North Campus Drive. In addition, the SPA is located approximately 3.5 miles southeast of the sphere of influence and departure flight paths of Mather Airport.

Ambient-Noise Survey

To document the existing noise environment, ambient-noise surveys were conducted at various locations within the SPA and in the surrounding area. The daytime A-weighted sound levels (i.e., weighted to represent the frequency range of human hearing) measured during the surveys are summarized in Table 3.11-1. Based on the measurements conducted, average daytime noise levels (in dBA L_{eq}) within the SPA and the surrounding area generally range from 42.2-dBA L_{eq} to 71.7-dBA L_{eq}, depending primarily on distance from nearby roadways. Exhibit 3.11-2 shows the locations of the short-term ambient noise measurement sites.

EXISTING NOISE SOURCES

The existing noise environment in and surrounding the project site is influenced primarily by surface-transportation noise emanating from vehicular traffic on area roadways. Vehicle traffic noise levels are attributed to Sunrise Boulevard, Grant Line Road, and Jackson Road (State Route [SR] 16). Aircraft overflights originating from Mather Airport also contribute to the ambient noise level on the SPA; however, based upon field observations, the contribution is relatively low. The ambient noise levels on the SPA are not influenced by noise generated by nearby commercial and industrial land uses, including the Sacramento Rendering Company located approximately 2,000 feet west of the SPA, and Kiefer Landfill located approximately 7,000 feet southeast of the SPA. Noise levels associated with these transportation and nontransportation noise sources, as perceived within the vicinity of the SPA, are discussed separately below.

Mather Airport

Mather Airport (formerly Mather Air Force Base [AFB], or Mather Field) has been open as a public-use air cargo and general-aviation airport since May 5, 1995. Managed by the County of Sacramento (County) Department of Airports, the airport, which operates 24 hours per day, seven days a week, consists of two primary runways, one

Table 3.11-1 Daytime Ambient-Noise Levels				
Location	Noise Sources	Date/Time	A-Weighted Sound Level (dBA)	
			L_{eq}	L_{max}
Site 1 – North of the Grant Line Road and Jackson Road intersection	Vehicle traffic on Grant Line Road and Jackson Road; 90 feet from the Grant Line Road centerline	5/1/07 10:15–10:30	62.0	77.0
Site 2 – North of Kiefer Road, south of Kiefer Landfill	Overall landfill operations: dump trucks, grinder/screener, dozers, compactors, excavators, energy plant, front loaders	5/1/07 11:15–11:30	54.7	60.4
Site 3 – North of Blodgett Reservoir	Distant traffic on Grant Line Road; aircraft overflight; birds (water fowl) and crickets	5/1/07 12:45–13:00	52.1	65.9
Site 4 – East of the Anatolia development, north of Kiefer Boulevard	Distant traffic on Sunrise Boulevard; distant constructions noise; aircraft overflight; birds (water fowl) and crickets	5/1/07 13:15–13:30	42.2	59.0
Site 5 – West of Grant Line Road	Vehicle traffic on Grant Line Road; 50 feet from the roadway centerline	5/1/07 14:05–14:20	65.8	77.8
Site 6 – South of Kiefer Boulevard, east of Sunrise Boulevard	Distant traffic on Sunrise Boulevard; aircraft overflight; birds (water fowl) and crickets	5/1/07 15:00–15:15	44.5	58.6
Site 7 – Sunrise Boulevard, south of Kiefer Boulevard	Vehicle traffic on Sunrise Boulevard, 50 feet from roadway centerline	5/1/07 15:30–15:45	71.7	82.0
Site 8 – East of Jaeger Road, north of Kiefer Boulevard	Construction noise; birds (water fowl) and crickets	5/1/07 16:30–16:45	43.0	56.5

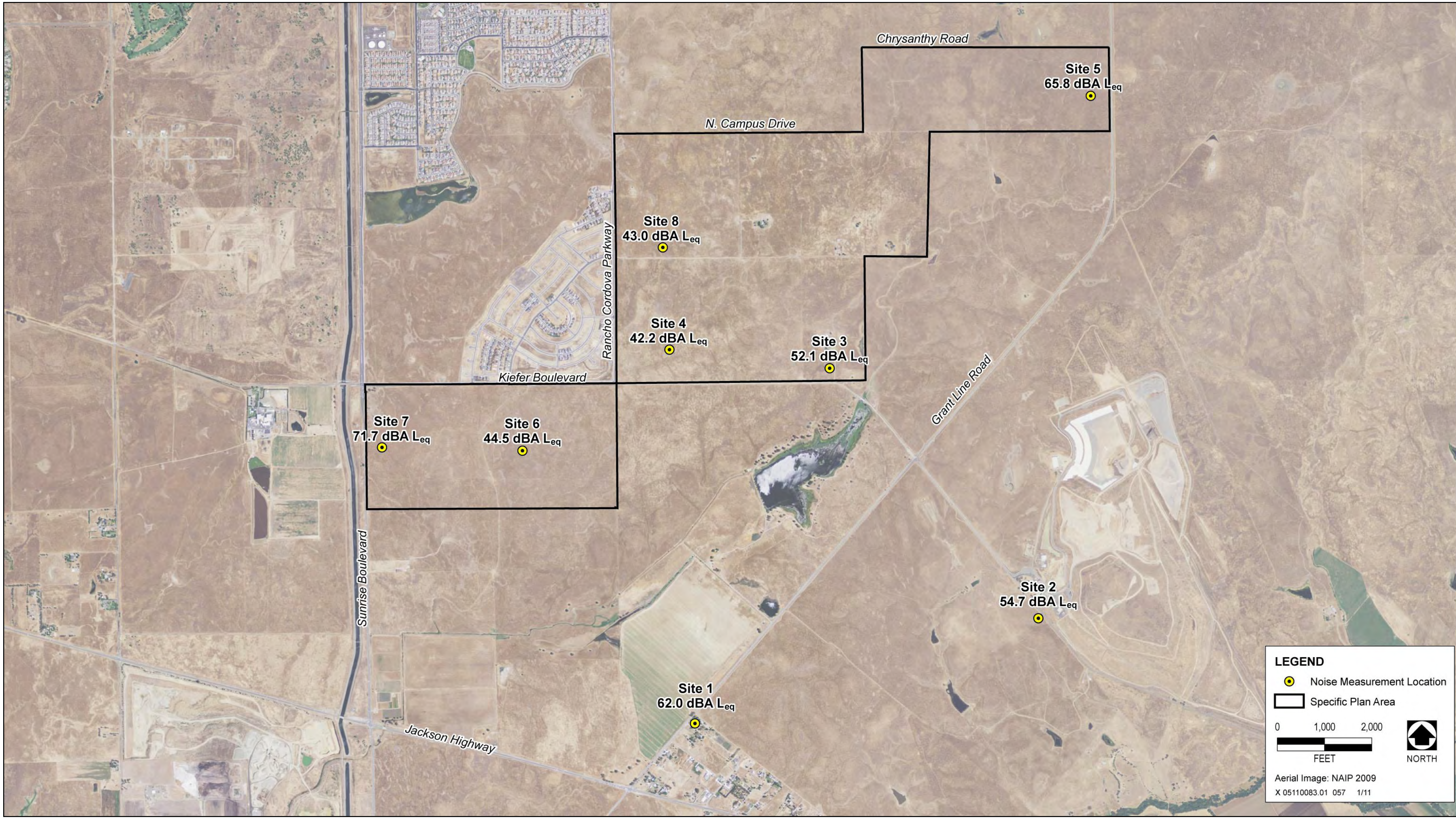
Notes: Measurements were conducted using a Larson Davis 820 sound-level meter placed 5.5 feet above ground surface, calibrated before and after each measurement.
dBA = A-weighted decibels; L_{eq} = energy-equivalent noise level; L_{max} = maximum noise level
Source: AECOM (formerly EDAW) field observations and noise measurements 2007

11,300 feet long and the other 6,100 feet long, generally aligned in a northeast-to-southwest direction. Mather Airport is a joint-use facility that supports both military and commercial operations, and it is rapidly developing as an air cargo depot. The airport includes approximately 40 acres of exclusive air cargo apron space.

Following the closure of Mather AFB in 1988, the County adopted a reuse plan for Mather Airport in fall 1991. The Airport Land Use Compatibility Plan (ALUCP) for Mather Airport was subsequently adopted in May 1997. As depicted in Exhibit 3.11-3, the project site is not located within the currently adopted 60- and 65-dBA CNEL noise contours of the ALUCP for Mather Airport. These noise contours, however, have been proposed for revision as part of the development of the *Mather Airport Master Plan*, which is currently being prepared by the Sacramento County Airport System. The revised noise contours have been proposed to account for existing and projected changes in aircraft operations that have occurred since development of the ALUCP for Mather Airport. The project would be located approximately 1.75 miles from the nearest point of the 60 dBA CNEL airport noise contour. As stated previously, the project site is located approximately 3.5 miles southeast of the sphere of influence and departure flight paths of Mather Airport.

Roadway Vehicle Traffic

Predicted roadway traffic noise levels were calculated using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis



Source: Prepared by AECOM 2011

Short-Term Ambient Noise Measurement Sites **Exhibit 3.11-2**

prepared by Fehr & Peers for this project. Additional input data included day/night percentages of automobiles, medium-duty trucks, and heavy-duty trucks; vehicle speeds; ground attenuation factors; and roadway widths. Existing traffic noise levels for area roadway segments most affected by project implementation are summarized in Table 3.11-2. Actual noise levels will vary from day to day, dependent on various factors including local traffic volumes, shielding from existing structures, variations in attenuation rates attributable to changes in surface parameters, and meteorological conditions. Appendix R provides a complete listing of the FHWA model inputs and results.

Industrial Land Uses

Industrial land uses in proximity of the SPA include Sacramento Rendering Company, Kiefer Landfill, Lopez Ag Service, and Sac Agg Plant located to the west, east, and south, respectively. These industrial uses include a variety of operations: articulated haul trucks, front loaders, excavators, bulldozers, grinder/screeners, belly dump trucks and an energy plant containing compressors and flare for waste gas burn off. Hours of operation for these land uses vary, but are generally limited to daytime hours. Noise levels associated with industrial land uses can vary greatly depending on the activities conducted. Activities involving the use of heavy-duty equipment such as front-end loaders, forklifts, and diesel-powered trucks are common noise sources typically associated with these land uses. Noise typically associated with industrial operations, including the use of heavy-duty equipment, can reach maximum levels of approximately 85 dBA at 50 feet (U.S. Environmental Protection Agency [EPA] 1971).

Sacramento Rendering Company

The Sacramento Rendering Company is located at 11350 Kiefer Boulevard, west of Sunrise Boulevard and adjacent to the southern portion of the SPA. The rendering facility is situated approximately 2,000 feet to the west of the SPA. Primary noise-generating activities at this facility include on-site truck traffic, augers, shredders, shaker screens, and compressors. Based upon AECOM's field observations, noise attributed to the Sacramento Rendering Company is not audible on the SPA.

Kiefer Landfill

The Kiefer Landfill is located at 12701 Kiefer Boulevard, approximately 7,000 feet southeast of the SPA. Primary noise-generating activities at the landfill include: grinder/screener, D-9 Dozers, CAT 836 compactors, dump trucks, excavators, motor graders, front loaders, compressors, gas plant, and flare. A short-term noise measurement was conducted at the south property line of the facility at approximately 890 feet from the overall landfill operations. Table 3.11-1 shows the results of the short-term noise measurement, labeled Site 2. Based upon AECOM field observations, noise from Kiefer Landfill is not audible on the SPA and does not affect the ambient noise levels.

Lopez Ag Service and Sac Agg Plant

The Lopez Ag Service and Sac Agg Plant are located at 11501 Florin Road and 11499 Florin Road, respectively. Both aggregate facilities are approximately 1.3 miles south of the SPA. Primary noise-generating activities associated with these facilities include: bottom dump trucks, front loaders, water trucks, conveyor belt systems, and hoppers. Based upon AECOM field observations, noise from these two facilities are not audible on the project site and do not affect the ambient noise levels.

3.11.2 Regulatory Framework

Federal Plans, Policies, Regulations, and Laws

The EPA Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act

Table 3.11-2 Summary of Modeled Existing Traffic Noise Levels							
Roadway Segment	**Between**		**CNEL/L_{dn} (dBA) 50 Feet from Centerline of Near Travel Lane**	**Distance (ft) from Roadway Centerline to CNEL/L_{dn} (dBA)**			
				70 CNEL	**65 CNEL**	**60 CNEL**	**55 CNEL**
SR 16	Excelsior Road	Eagles Nest Road	70.8	60	190	600	1,897
SR 16	Sunrise Boulevard	Grant Line Road	72.1	81	256	810	2,562
Kiefer Boulevard	Grant Line Road	north of SR 161	61.7	7	23	74	235
Mather Boulevard	Femoyer Street	Douglas Road	66.9	25	78	247	782
Douglas Road	Mather Boulevard	Sunrise Boulevard	66.2	21	65	206	652
Douglas Road	Sunrise Boulevard	Grant Line Road	62.8	9	30	95	300
International Drive	South White Rock Road	Zinfandel Drive	68.8	38	120	380	1,200
International Drive	Zinfandel Drive	Kilgore Road	66.3	22	68	215	680
White Rock Road	Zinfandel Drive	Sunrise Boulevard	71.2	66	208	658	2,081
White Rock Road	Sunrise Boulevard	Grant Line Road	64.4	14	44	139	440
Folsom Boulevard	Zinfandel Drive	Sunrise Boulevard	71.1	64	203	642	2,031
Folsom Boulevard	Sunrise Boulevard	Hazel Avenue	69.3	42	133	421	1,331
Mather Field Road	Folsom Boulevard	U.S. 50 westbound ramps	73.4	109	344	1,088	3,441
Mather Field Road	U.S. 50 eastbound ramps	International Drive	74.4	139	439	1,389	4,393
Zinfandel Drive	Folsom Boulevard	U.S. 50 westbound ramps	71.6	72	227	718	2,271
Zinfandel Drive	U.S. 50 eastbound ramps	White Rock Road	74.2	133	419	1,326	4,192
Zinfandel Drive	White Rock Road	International Drive	71.0	62	197	623	1,971
Sunrise Boulevard	Gold Country Boulevard	Coloma Road	76.7	235	744	2,354	7,443
Sunrise Boulevard	Coloma Road	U.S. 50 westbound ramps	76.5	224	707	2,237	7,073
Sunrise Boulevard	U.S. 50 eastbound ramps	Folsom Boulevard	75.2	165	521	1,648	5,212
Sunrise Boulevard	Folsom Boulevard	White Rock Road	73.9	122	387	1,224	3,872
Sunrise Boulevard	White Rock Road	Douglas Road	73.1	101	321	1,014	3,206
Sunrise Boulevard	Douglas Road	SR 16	72.2	82	261	824	2,607
Sunrise Boulevard	SR 16	Grant Line Road	69.5	44	139	441	1,395
Hazel Avenue	Winding Way	U.S. 50 westbound ramps	75.3	168	530	1,677	5,302
Grant Line Road	White Rock Road	Douglas Road	66.9	25	78	247	782
Grant Line Road	Douglas Road	SR 16	67.4	28	87	276	873
Grant Line Road	SR 16	Sunrise Boulevard	66.6	23	73	231	730

Notes: CNEL = community equivalent noise level; L_{dn} = day-night average noise level; dBA = A-weighted decibels; ft = feet; SR = State Route; U.S. 50 = U.S. Highway 50.
Traffic noise levels were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis prepared for this project (see Section 3.15, "Traffic and Transportation"). Modeling assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).
Source: Data provided by AECOM in 2010

of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies, allowing more individualized control for specific issues by designated Federal, state, and local government agencies.

Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bio Acoustics, and Bio Mechanics (CHABA) at the request of EPA. For fragile structures, CHABA recommends a maximum limit of 0.25 in/sec PPV (Caltrans 2004:17).

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The State of California has adopted noise standards in areas of regulation not preempted by the Federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation.

Title 24 of the California Code of Regulations, also known as the California Building Standards Code, establishes building standards applicable to all occupancies throughout the state. The code provides acoustical regulations for both exterior-to-interior sound insulation as well as sound and impact isolation between adjacent spaces of various occupied units. Title 24 regulations state that interior noise levels generated by exterior noise sources shall not exceed 45-dB L_{dn} (see Section 3.11.1, “Acoustic Fundamentals” for a description of dBA and L_{dn} is described in Section 4.11.2.1, “Noise Descriptors”), with windows closed, in any habitable room for general residential uses.

Though not adopted by law, the *State of California General Plan Guidelines 2003*, published by the California Governor’s Office of Planning and Research (OPR), provides guidance for the compatibility of projects within areas of specific noise exposure. Table 3.11-3 presents acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community’s sensitivity to noise, and the community’s assessment of the relative importance of noise pollution.

California Department of Transportation

For the protection of fragile, historic, and residential structures, Caltrans recommends a more conservative threshold of 0.2 in/sec PPV for normal residential buildings and 0.08 in/sec PPV for old or historically significant (as defined under CEQA) structures (Caltrans 2004:17). These standards are more stringent than the recommended guidelines established by FTA, presented above.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Mather Airport Land Use Compatibility Plan

The State of California has adopted airport noise and safety standards that are implemented through Comprehensive Land Use Plans (CLUPs) prepared for public-use airports. The CLUPs are prepared and maintained by the Airport Land Use Commissions (ALUCs). In Sacramento County, the Sacramento Area Council of Governments (SACOG) serves as the ALUC. The noise and safety standards identified in the CLUPs for local airports are implemented through the control of land use around airports with regard to the noise, safety, and height restrictions. SACOG also works with cities and counties to ensure consistency between local land use plans and CLUPs developed for local airports.

Table 3.11-3
State of California Noise Compatibility Guidelines by Land Use Category

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential—Low-Density Single-Family, Duplex, Mobile Home	<60	55–70	70–75	75+
Residential—Multiple-Family	<65	60–70	70–75	75+
Transient Lodging, Motel, Hotel	<65	60–70	70–80	80+
School, Library, Church, Hospital, Nursing Home	<70	60–70	70–80	80+
Auditorium, Concert Hall, Amphitheater		<70	65+	
Sports Arenas, Outdoor Spectator Sports		<75	70+	
Playground, Neighborhood Park	<70		67.5–75	72.5+
Golf Courses, Stable, Water Recreation, Cemetery	<75		70–80	80+
Office Building, Business Commercial, and Professional	<70	67.5–77.5	75+	
Industrial, Manufacturing, Utilities, Agriculture	<75	70–80	75+	

Notes: L_{dn} = day-night average noise level; CNEL = community equivalent noise level; dBA = A-weighted decibels.

1 Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

2 New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

3 New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.

4 New construction or development should generally not be undertaken.

Source: OPR 2003:244-254

The ALUCP for Mather Airport, formerly called the Mather Airport CLUP, was adopted in May 1997 and includes regional policies for land use compatibility with respect to aircraft noise. The ALUCP for Mather Airport requires that as development occurs in the area near the airport, affected cities and counties should evaluate the impact of aircraft noise on proposed development. The ALUCP prohibits new residential development within the 65-dBA CNEL noise contours.

In addition, the County is currently in the process of developing the *Mather Airport Master Plan*. The Master Plan will be used to guide airport development in the Mather Airport Policy Area (MAPA) over the next 20 years, while attempting to resolve related aviation, environmental, and socioeconomic issues existing in the community. One of the primary issues to be addressed in the plan relates to the exposure of citizens in nearby communities to noise generated by aircraft on approach and departure routes from Mather Airport.

The MAPA was approved by the Sacramento County Board of Supervisors in 1998 and is intended to create additional protection beyond the restrictions described in the ALUCP for Mather Airport. In addition to prohibiting new residential development within the 65-dBA CNEL contour, per the ALUCP for Mather Airport, the MAPA prohibits new residential development within the 60-dBA CNEL contour. New residential development within the MAPA, but outside the 60-dBA CNEL contour, may be approved but will be subject to the following conditions:

- provision of minimum noise insulation to achieve 45 dB within new residential dwellings, including detached single-family dwellings, with windows closed in any habitable room;
- notification in the public report prepared by the California Department of Real Estate disclosing to prospective buyers that the parcel is located within the MAPA; and

- an aviation easement prepared by the County Counsel's Office, granted to the County, recorded with the County Recorder, and filed with the County Department of Airports. Such an aviation easement shall acknowledge the property location within the MAPA and shall grant the right of flight and unobstructed passage of all aircraft into and out of Mather Airport.

City of Rancho Cordova General Plan

The *City of Rancho Cordova General Plan* (City General Plan 2006) Noise Element identifies noise criteria for various stationary and transportation noise sources. The Noise Element of the City General Plan supersedes the Noise Element of the *County of Sacramento General Plan* (County General Plan). Goals and policies of the City General Plan relating to noise that the City has found to be applicable to the Proposed Project and alternatives under consideration are listed in Appendix K.

Performance standards for stationary noise sources and maximum allowable noise exposure from transportation noise sources, as specified in the Noise Element of the City General Plan, are included below as Tables 3.11-4, 3.11-5, and 3.11-6, because they are part of the thresholds for determining the significance of impacts for this analysis.

Table 3.11-4
Performance Standards for Typical Stationary Noise Sources—
Rancho Cordova General Plan Noise Element

Noise Level Descriptor	Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)
Hourly L_{eq}, dB	55	45

Note: dB = decibels; L_{eq} = energy-equivalent noise level
Source: City of Rancho Cordova 2006

Table 3.11-5
Performance Standards for Stationary Noise Sources that Are Tonal, Impulsive, Repetitive, or Consist Primarily of Speech or Music—Rancho Cordova General Plan Noise Element

Noise Level Descriptor	Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)
Hourly L_{eq}, dB	50	40

Note: dB = decibels; L_{eq} = energy-equivalent noise level
Source: City of Rancho Cordova 2006

3.11.3 Environmental Consequences and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under the National Environmental Policy Act (NEPA) to determine the significance of an action in terms of its context and the intensity of its effects. A noise impact is considered significant if implementation of the proposed project or alternatives under consideration would do any of the following:

- result in short-term noise levels during construction that would exceed applicable City noise standards (Tables 3.11-4 and 3.11-7) or result in increased levels of annoyance or sleep disruption during noise-sensitive periods of the day (for purposes of this analysis, between 7 p.m. and 7 a.m.);

Table 3.11-6 Maximum Allowable Noise Exposure, Transportation Noise Sources— Rancho Cordova General Plan Noise Element			
Land Use	**Outdoor Activity Areas[1] L_{dn}/CNEL, dB**	**Interior Spaces**	
		L_{dn}/CNEL, dB	**L_{eq}, dB[2]**
Residential	60[3]	45	–
Residential subject to noise from railroad tracks, aircraft overflights, or similar noise sources that produce clearly identifiable, discrete noise events (the passing of a single train, as opposed to relatively steady noise sources such as roadways)	60[3]	40[5]	–
Transient Lodging	60[4]	45	–
Hospitals, Nursing Homes	60[3]	45	–
Theaters, Auditoriums, Music Halls	–	–	35
Churches, Meeting Halls	60[3]	–	40
Office Buildings	–	–	45
Schools, Libraries, Museums	–	–	45
Playgrounds, Neighborhood Parks	70	–	–

Note: L_{dn}= day-night average noise level; CNEL = community equivalent noise level; dB = decibels; L_{eq} = energy-equivalent noise level

1 Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.

2 As determined for a typical worst-case hour during periods of use.

3 Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

4 In the case of hotel/motel facilities or other transient lodging, outdoor activity areas such as pool areas may not be included in the project design. In these cases, only the interior noise level criterion will apply.

5 The intent of this noise standard is to provide increased protection against sleep disturbance for residences located near railroad tracks.

Source: City of Rancho Cordova 2006

- result in long-term stationary-source noise levels that would exceed applicable City noise standards (Tables 3.11-4, 3.11-5, and 3.11-7);

- result in a noticeable increase in traffic noise levels (i.e., 3 dBA CNEL or greater) or contribute to existing or predicted traffic noise levels that exceed applicable noise standards (Table 3.11-6) at noise-sensitive receptors (persons and land uses);

- result in predicted noise levels at on-site receptors exceeding applicable noise criteria for land use compatibility (Table 3.11-6); or

- expose on-site receptors to single-event aircraft noise that would result in potential speech interference or sleep disruption. For purposes of this analysis, speech interference and sleep disruption would be anticipated to occur at noise levels of 60- dBA and 80-dBA SEL, respectively (Caltrans 2002, Federal Interagency Committee on Noise [FICON] 1992);

Table 3.11-7 City of Rancho Cordova Noise Control Ordinance Standards			
Land Use	**Period of Measurement**	**Maximum Acceptable Noise Standards**	
		Exterior Noise Standards[1]	**Interior Noise Standards**
Residential, School, Church, Hospital, Agricultural Land Uses	7 a.m.–10 p.m.	55 dBA[2]	-
	10 p.m.–7 a.m.	50 dBA[2]	-
Apartment, Condominium, Townhouse, Duplex, or Multidwelling Unit	10 p.m.–7 a.m.[3] 5 minutes/hour: 15 minutes/hour: Any period of time:	-	 45 dBA 50 dBA 55 dBA

Note: dBA = A-weighted decibels

[1] The following noise standards, unless otherwise specifically indicated in the City of Rancho Cordova Municipal Code, shall apply to all properties within a designated noise area.

[2] Cumulative duration of intrusive sound: It is unlawful for any person within the city to create any noise that causes the noise level on the affected property, when measured in the designated noise area, to exceed for the duration of time set forth following, the specified exterior noise standards in any one hour by (noise limits shall be reduced by 5 dBA for impulsive or simple tone noise, or noise consisting of speech or music):
A. 30 minutes: +0 dBA
B. 15 minutes: +5 dBA
C. 5 minutes: +10 dBA
D. 1 minute: +15 dBA
E. Level not to be exceeded for any time: +20 dBA
In addition to the above standards, interfering noise at schools, churches, or hospitals, while the same is in use, that is 10 dBA or greater than the ambient noise level at the building, shall be deemed excessive and unlawful. Residential-use HVAC [heating, ventilation, and air conditioning] system equipment, such as pumps, fans, air conditioners, and cooling towers, shall not exceed 60 dBA at any point at least 1 foot inside the property line of the affected residential or agricultural property line, or 55 dBA when measured in the center of a neighboring patio or at the exterior window of the affected residential unit.

[3] Based on cumulative periods of time during any one hour. Interior noise levels, when measured in the neighboring unit, shall not exceed the specified standards for the corresponding cumulative period of time during any hour.

Source: City of Rancho Cordova Municipal Code, Noise Control Ordinance

- expose persons to or generate excessive groundborne vibration or groundborne noise levels (i.e., 0.2 in/sec PPV for the prevention of structural damage and 78 VdB for the prevention of human disturbance at sensitive land uses).

- expose persons to or generate excessive groundborne vibration or groundborne noise levels (i.e., 0.2 in/sec PPV for the prevention of structural damage and 78 VdB for the prevention of human disturbance at sensitive land uses).

The land use compatibility noise criteria in the City General Plan are listed in Table 3.11-6. Additional noise standards, including the State of California interior noise standards for multifamily residential dwellings (Title 24 of the California Code of Regulations) and the City noise standards for nontransportation noise sources (Tables 3.11-4, 3.11-5, and 3.11-7), were also taken into consideration.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR/EIS

Land Use Compatibility Related to Exposure of On-Site Receptors to 24-hour Aircraft Noise—As noted previously, Mather Airport is located approximately 3.5 miles from the SPA. Per the contour maps prepared in 2004 for the Mather Airport Master Plan, which update the contour maps included as part of the currently adopted

Mather Airport Comprehensive Land Use Plan, the SPA is located approximately 1.75 miles from the nearest point of the airport's 60-dBA CNEL contour. Title 24 and the Rancho Cordova General Plan establish 45-dBA L_{dn}/CNEL as an interior noise threshold for acceptable residential development. Assuming an average interior-exterior noise attenuation of 25 dBA with windows closed (Veneklasen 1973), interior noise levels associated with aircraft operations would be well below the 45-dBA standard, and residents within the SPA would not be exposed to excessive aircraft noise. Therefore, there would be no impact, and this issue is not evaluated further in this EIR/EIS.

Single-Event Aircraft Noise—Regarding single event aircraft noise, the SPA is not located within the direct continuous descent approach flight path used by Mather Airport aircraft (ESA Airports 2006:Figure 2). Single-event noise measurements for aircraft were taken most recently in February 2006; the nearest measurement to the SPA was taken at 2305 Farnoon Court in Folsom (ESA Airports 2006:3). Single-event noise levels at 2305 Farnoon Court were approximately 74-dBA SEL. This location is directly in the Mather Airport runway 22L flight path and is approximately 7.75 miles northeast of the SPA. Because of the distance between the SPA and Mather Airport, the project would not be located within identified existing and future noise contours of Mather Airport or the SNEL noise abatement area for Mather Airport runway 22L (Sacramento County Airport System [SCAS] 2011:4), and because the flight path from runway 22L is located 3.5 miles north of the project site, noise levels of 60-dBA or 80-dBA SEL from single-event aircraft noise would not be experienced at sensitive receptors on the SPA. Therefore, there would be no impact, and this issue is not evaluated further in this EIR/EIS.

ANALYSIS METHODOLOGY

To assess potential temporary and short-term (construction-related, including demolition) noise impacts, sensitive receptors and their relative exposure were identified. Project-generated construction-source noise levels at these sensitive receptors were determined using the Federal Transit Noise and Vibration Impact Assessment methodology for construction noise prediction (FTA 2006) along with reference emission noise levels and usage factors based on information contained in the *FHWA Roadway Construction Noise Model User's Guide* (FHWA 2006).

Regarding project-generated increases in traffic noise, AECOM conducted modeling for affected roadway segments using the FHWA Highway Traffic Noise Prediction Model (RD-77-108) (FHWA 1978) and traffic data (e.g., average daily traffic [ADT] volumes, vehicle speeds, percent distribution of vehicle types) from Fehr & Peers and Caltrans. This model is based on the California vehicle noise (CALVENO) reference noise emission factors for automobiles, medium trucks, and heavy trucks with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors and does not assume any natural or human-made shielding (e.g., vegetation, berms, walls, or buildings). Increases in traffic noise levels attributable to the project were calculated by comparing the predicted noise levels at 50 feet from the centerline with and without project-generated traffic under baseline and cumulative conditions.

To determine the project's land use compatibility with future traffic noise levels attributable to project area roadways (e.g., Sunrise Boulevard, Rancho Cordova Parkway, North Campus Drive, Grant Line Road, Kiefer Boulevard), AECOM used the FHWA Traffic Noise Model (TNM). TNM computes traffic noise levels by considering topography, ground type, intervening structures, vehicle speed, roadway grade, and traffic volume. Modeling the project using TNM ensures that the project's land uses are compatible with the applicable interior and exterior noise levels modeled on the SPA. The modeled traffic noise levels reveal whether development of the project would exceed the applicable noise criteria. Where traffic noise levels are predicted to exceed applicable noise criteria, TNM is used to determine barrier heights that would reduce traffic noise levels to acceptable levels at outdoor activity areas.

With respect to nontransportation noise sources (e.g., stationary) associated with project implementation, the assessment of long-term (operational-related) impacts was based on reconnaissance data, existing documentation, and standard attenuation rates and modeling techniques.

The methods identified above for transportation and nontransportation source noise were also used to assess the compatibility of the project with future on-site noise levels.

To assess the potential exposure of sensitive receptors to, and generation of excessive groundborne vibration and noise levels, sensitive receptors and their relative exposure were determined based on documented source-specific vibration levels and standard modeling procedures as recommended by Federal and state agency guidance.

To evaluate relative significance, noise and vibration impacts were determined based on comparisons to applicable regulations and guidance provided by Federal, state, and local agencies.

Construction-noise and stationary-source noise impacts were calculated based on the distance from source to receptor, assuming an average noise attenuation rate of 6 dBA per doubling of distance.

Impact Analysis

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.11-1 **Possible Temporary, Short-Term Exposure of Sensitive Receptors to Construction-Generated Equipment Noise.** *Project implementation would result in temporary, short-term construction activities associated with project development. Project-related construction activities could expose existing off-site and future on-site sensitive receptors to temporary noise levels that exceed the applicable noise standards and/or result in a substantial increase in ambient noise levels.*

NP

Because no new project-related construction would occur under the No Project Alternative, no sensitive receptors would be exposed to construction noise; thus, **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, PP, BIM, CS, ID

The project includes a mix of land uses, including residential, commercial, schools, community parks, and open space. Construction of on-site public services, utilities, and other infrastructure improvements, such as roadways and bicycle paths, would be needed to support development of the project. Construction of the proposed land uses and improvements would occur by sub-areas, within each phase of the SPA, in a sequence established by individual land owners and influenced by market demand. See Exhibit 2-19 in Chapter 2, “Alternatives” for the proposed phasing plan.

Construction noise typically occurs intermittently and varies depending upon the nature or phase of construction (e.g., demolition/land clearing, grading and excavation, and erection). Construction noise in any one particular area would be temporary and short-term and would include noise from activities such as site preparation, truck hauling of material, pouring of concrete, and use of power tools. Noise would also be generated by construction equipment, including earthmovers, material handlers, and portable generators, and could reach high levels for brief periods. Although noise ranges are generally similar for all construction phases, the grading phase tends to involve the most equipment. The EPA has found that the noisiest equipment types operating at construction sites typically range from 88-dBA to 91-dBA L_{max} at 50 feet (Table 3.11-8). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Average noise levels at construction sites typically range from approximately 65- to 89-dBA L_{eq} at 50 feet, depending on the activities performed (FTA 2006:12-6).

Table 3.11-8 Typical Construction Equipment Noise Levels	
Equipment Item	**Typical Maximum Noise Level (dB) at 50 Feet**
Earthmoving	
Backhoes	80
Bulldozers	85
Front Loaders	80
Graders	85
Paver	85
Roller	85
Scrapers	85
Tractors	84
Slurry Trencher	82
Dump Truck	84
Pickup Truck	55
Materials Handling	
Concrete Mixer Truck	85
Concrete Pump Truck	82
Crane	85
Man Lift	85
Stationary Equipment	
Compressors	80
Generator	82
Pumps	77
Impact Equipment	
Compactor	80
Jack Hammers	85
Impact Pile Drivers (Peak Level)	95
Pneumatic Tools	85
Rock Drills	85
Other Equipment	
Concrete Saws	90
Vibrating Hopper	85
Welding Machine/Torch	73

Notes: dB = decibels
Noise levels are for equipment fitted with properly maintained and operational noise control devices, per manufacturer specifications.
Sources: Bolt, Beranek and Newman Inc. 1981, FTA 2006:12-6

The City Noise Ordinance exempts construction operations that occur during the hours of 7 a.m.–6 p.m. Monday through Saturday and 9 a.m.–6 p.m. on Sundays. Construction activities that do not occur during these specified hours are not exempt and would be required to comply with the standards in the City Noise Ordinance and performance standards in the Noise Element of the City General Plan. Activities occurring during the more noise-sensitive evening and nighttime hours of 6 p.m.–7 a.m. Monday through Saturday or 6 p.m.–9 a.m. on Sunday are of increased concern given the potential for increased levels of annoyance and potential sleep disruption to occupants of the nearby residential dwellings east of Rancho Cordova Parkway and north of Kiefer Boulevard in the Anatolia development. In addition, implementation of the phased development of the site would result in potential disruption of on-site noise sensitive receptors constructed in earlier phases. It is important to note that currently the only noise-sensitive land uses are the newly developing residential areas south of Douglas Road in the Sunridge Specific Plan area. However, phased development of the SPA would result in potential on-site noise conflicts.

In addition, construction operations occurring during the daytime hours and in the vicinity of schools or other noise-sensitive daytime land uses such as childcare and convalescent care facilities, hospitals, residences, or places of worship may result in increased interior noise levels. Assuming an average exterior-to-interior noise reduction of 25 dBA (with windows closed), exterior construction-generated noise levels in excess of 70 dBA at the façade of a building would be considered to result in potential increases in interior noise levels in excess of 45-dBA L_{eq}. Based on this same assumption, and assuming a maximum construction noise level of 89 dBA L_{eq} and an average attenuation rate of 6 dBA per doubling of distance from the source, construction activities located within approximately 800 feet of daytime noise-sensitive receptors could result in interior noise levels in excess of 45-dBA L_{eq}. Construction-generated noise would therefore be considered to result in a **direct**, **potentially significant** temporary, short-term noise impact on nearby noise-sensitive land uses. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.11-1: Implement Measures to Prevent Exposure of Sensitive Receptors to Temporary Construction-Generated Equipment Noise.

To reduce impacts associated with noise generated during construction activities, the project applicants for any particular discretionary development application shall conform to the following requirements:

- Noise-generating construction operations shall be limited to the hours between 7 a.m. and 7 p.m. Monday through Friday, and between 8 a.m. and 6 p.m. on Saturday and Sunday.

- All construction equipment and equipment staging areas shall be located as far as feasible from nearby noise-sensitive land uses.

- All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

- All motorized construction equipment shall be shut down when not in use to prevent excessive idling noise.

- The following measures shall be required for exterior activities that involve the use of heavy-duty construction equipment (see Table 3.11-8) located within 800 feet of occupied noise-sensitive daytime land uses (e.g., school classrooms, childcare and convalescent care facilities, inpatient medical facilities, and places of worship):

  - Individual operations and techniques shall be replaced with quieter procedures (e.g., using welding instead of riveting, mixing concrete off-site instead of on-site).

  - Written notification of construction activities shall be provided to all noise-sensitive receptors located within 800 feet of construction activities. Notification shall include anticipated dates and hours during which construction activities are anticipated to occur and contact information, including a daytime telephone number, for the project representative to be contacted in the event that noise levels are deemed excessive. Recommendations to assist noise-sensitive land uses in reducing interior noise levels (e.g., closing windows and doors) shall also be included in the notification.

- To the extent feasible, acoustic barriers (e.g., plywood, sound blankets) shall be constructed to reduce construction-generated noise levels at affected noise-sensitive land uses. The barriers shall be designed to obstruct the line of sight between the noise-sensitive land use and on-site construction equipment. When installed properly, acoustic barriers can reduce construction noise levels by approximately 8–10 dBA (EPA 1971).

Implementation: Project applicants for any particular discretionary development application.

Timing: During all phases of project construction.

Enforcement: City of Rancho Cordova Planning Department.

With implementation of Mitigation Measure 3.11-1, construction would be limited to daytime hours, for which associated noise levels are considered exempt from the provisions of the City Noise Ordinance, and equipment would be properly maintained and sound barriers installed, resulting in levels below the City's noise standards. Therefore, implementation of this mitigation measure would reduce potentially significant impacts from temporary construction noise under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level.

IMPACT 3.11-2 **Possible Temporary, Short-Term Exposure of Sensitive Receptors to Increased Traffic Noise Levels from Project Construction.** *Project implementation would result in temporary increases in on- and off-site roadway traffic noise associated with project construction. Construction-generated traffic could expose sensitive receptors to noise levels along on- and off-site roadways that exceed the applicable noise standards and/or result in a substantial increase in ambient noise levels.*

NP

Under the No Project Alternative, no project-related development would occur. Therefore, there would be no exposure of sensitive receptors to project-generated construction traffic, and **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

Construction of all five action alternatives would result in additional vehicle trips on the local roadway network from worker commute and the transport of equipment and materials. The exact number of daily trips required for project construction is not known at this time. However, said activities typically do not include more than 500 daily one-way trips even with projects that involve intensive earth movement activities (e.g., soil import/export), which would not be anticipated for construction of any of the on- or off-site elements. An increase in traffic noise levels of 3-dB CNEL/L_{dn} or greater at noise-sensitive receptors along affected roadway segments would be considered substantial as such is perceivable to the human ear. Typically, when the ADT volume is doubled on a roadway segment in comparison to existing conditions, the resultant increase is approximately 3-dB CNEL/L_{dn}. According to the traffic analysis, ADT volumes on roadway segments in the project vicinity range from 1,800 to 74,700 under existing no-project conditions. Therefore, project construction would not be anticipated to result in a doubling of ADT volumes (e.g., assuming a maximum of 500 additional one-way trip to roadways with a minimum of 1,800 under existing conditions) along affected roadway segments even when considering the increased tire and engine source noise from these types of trips (e.g., primarily heavy-duty trucks). Thus, implementation of the Proposed Project and the other four action alternatives would not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project from project construction traffic; or, consequently, expose sensitive receptors to or generate noise levels in excess of applicable standards. As a result, this **direct** impact would be **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.11-3 **Possible Long-Term Exposure of Sensitive Receptors to Stationary-Source Noise Generated by On-site Land Uses During Project Operation.** *Project implementation would result in increases in on-site stationary-source noise levels associated with the proposed residential, commercial, mixed-use, office/ industrial, park, and educational land uses. These stationary noise sources could exceed the applicable noise standards (hourly and maximum) and result in a substantial increase in ambient noise levels.*

NP

Because no project-related stationary-noise sources would be introduced under the No Project Alternative, no sensitive receptors would be exposed to on-site stationary noise sources; thus, **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP

Various types of nontransportation noise sources would accompany new development in the SPA. The sources and levels of noise typically associated with each land use are discussed separately below.

Residential

Substantial stationary sources of noise associated with residential land uses are typically limited to the operation of exterior central air conditioning units. Residential-use central air conditioning units typically range from 45 to 70-dB L_{eq} at a distance of 50 feet (EPA 1971). Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the No USACE Permit Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would result. This impact would be less than under the Proposed Project because 338 fewer residential units would be constructed. ***[Lesser]***

Commercial

The No USACE Permit Alternative includes a total of only 7.8 acres of commercial mixed-uses (as compared to approximately 32 acres under the Proposed Project Alternative), and the proposed 60-acre Local Town Center would not be constructed under this alternative. Substantial sources of noise from commercial mixed uses are generated mainly by heating and ventilation equipment and loading and unloading activities. Because residential land uses would be placed in close proximity to commercial mixed-use development, these sensitive receptors could be exposed to higher noise levels.

Noise levels from commercial central air conditioning units can reach 100 dBA at very close distances (EPA 1971). However, these units usually have noise shielding cabinets and therefore are not usually substantial sources of noise impacts. Limited volumes of small delivery vehicle traffic would occur at small loading/unloading areas in the commercial areas and thus could be a periodic and temporary source of noise to nearby or adjacent sensitive receptors for short periods. This type of delivery vehicle would not require the use of ancillary equipment (e.g., forklift) and would generally consist of side-step box trucks with a delivery time of 10 to 15 minutes.

Emergency generators may be used to supply necessary power requirements to vital systems within commercial/offices facilities. Emergency generators are typically operated under two conditions: loss of main electrical supply or preventive maintenance/testing. The operation of mechanical equipment associated with emergency operations is exempt from the noise standards outlined in the City of Rancho Cordova Noise Ordinance; thus, this analysis focuses on routine preventive maintenance and testing operations, which are conducted on a periodic basis.

Reference noise-level measurements of emergency generators with rated power outputs from 50 kilowatts (kW) to 125 kW results in noise levels ranging from 61- to 73-dB L_{eq} and 63- to 84-dB L_{max} at a distance of 45 feet (EPA 1971, FHWA 2006). Based on these reference noise levels, emergency electrical generators located within 700 feet of noise-sensitive land uses could exceed the City noise standard for daytime stationary-source noise. In addition, generators located within 1,200 feet of noise-sensitive land uses could exceed the City noise standard for nighttime stationary-source noise.

As a result, increased noise levels associated with the proposed commercial mixed-use land uses under the No USACE Permit Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would result. This impact would be substantially smaller than under the Proposed Project Alternative because only 6.7 acres of commercial mixed-uses would be constructed (as compared to 91.3 acres under the Proposed Project Alternative), and the 60-acre Local Town Center would not be constructed. ***[Lesser]***

Public/Quasi-Public

The proposed land uses would also include emergency facilities such as a fire station (along Rancho Cordova Parkway south of Kiefer Boulevard) that would generate high noise levels from alarms and vehicle movements when station crews respond to emergency situations. Noise levels associated with the operation of emergency activities are exempt from the City of Rancho Cordova Noise Ordinance and the proposed fire station is anticipated to include perimeter walls around the emergency facilities to shield noise-sensitive receptors from facility operational noise. However, emergency situations to which fire stations respond are associated with excessively high noise levels in order to alert vehicles and pedestrians of oncoming emergency vehicles. Although the City’s noise ordinance exempts emergency activities, the potential to cause a temporary increase in ambient noise levels (i.e., greater than 3 dBA) exists and may be considered annoying by receptors. As a result, increased noise levels associated with the proposed public/quasi public land uses under the No USACE Permit Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. This impact would be smaller than the Proposed Project Alternative because only 4 acres of public/quasi public land uses would be constructed, as compared to approximately 13 acres under the Proposed Project Alternative. ***[Lesser]***

Schools and Neighborhood Parks

The No USACE Permit Alternative includes development of school-related uses and neighborhood parks. Noise-generating activities occurring at such facilities would be controlled by the school and the recreation and park districts, and would depend on facility type. Daytime noise associated with schools and neighborhood parks typically includes intermittent noise such as adults’ and children’s voices, opening and closing of vehicle doors in parking lots, and use of landscape maintenance equipment. School uses may also result in mechanical noise associated with building ventilation systems. Maximum intermittent noise levels commonly associated with parking lots can reach levels of 70 dBA at 500 feet from the occasional sounding of car alarms and amplification of music. Noise levels associated with landscape maintenance activities, including the use of large gasoline-powered mowers and leaf blowers, can range from approximately 66 to 72 dBA at 25 feet. Mechanical noise associated with operation of ventilation equipment required to service school facilities can result in average noise levels of 55 dBA at approximately 175 feet from the source.

Recreational facilities at neighborhood parks, middle schools, and high schools could generate additional noise extending into the evening and nighttime hours during competitive sporting events (e.g., soccer games, football games, softball games, and track and field events). Noise sources commonly associated with these types of events include elevated voices from crowds, exterior public-address systems, and musical instruments. Previously conducted noise measurements by AECOM for similar activities indicates that noise can exceed 50 dBA L_{eq} within 800 feet of the event associated with recreational events (such as soccer and football games), including noise from spectators and players. If an amplified speaker system is used during sporting events, additional increases in ambient noise levels could occur. Activities occurring during the more noise-sensitive evening and nighttime hours may result in increased levels of annoyance and sleep disruption for occupants of nearby residential dwellings.

As a result, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. This impact would be substantially smaller than under the Proposed Project Alternative because only 29 acres of schools and 33 acres of neighborhood parks would be constructed, as compared to the Proposed Project Alternative which includes 110 acres of schools, the neighborhood parks, and a 39-acre and 15-acre community park. ***[Lesser]***

Community Parks

The No USACE Permit Alternative does not include any community parks. Therefore, **no direct** or **indirect** impacts would occur. ***[Lesser]***

Mitigation Measure 3.11-3: Implement Measures to Reduce Potential Exposure of Sensitive Receptors to Stationary Source–Generated Noise.

To reduce potential long-term exposure of sensitive receptors to noise generated by project-related stationary noise sources, the City shall evaluate individual facilities, subdivisions, and other project elements for compliance with the City Noise Ordinance and policies contained in the City General Plan at the time that tentative subdivision maps and improvements plans are submitted. All project elements shall comply with City noise standards. The project applicants for any particular discretionary development application shall implement the following measures to assure maximum reduction of project interior and exterior noise levels from operational activities.

- The proposed land uses shall be designed so that on-site mechanical equipment (e.g., HVAC units, compressors, generators) and area-source operations (e.g., loading docks, parking lots, and recreational-use areas) are located as far as feasible from or shielded from nearby noise-sensitive land uses.

- Residential air conditioning units shall be located a minimum of 10 feet from adjacent residential dwellings, including outdoor entertainment and relaxation areas, or shall be shielded to reduce operational noise levels at adjacent dwellings or designed to meet City noise standards. Shielding may include the use of fences or partial equipment enclosures. To provide effectiveness, fences or barriers shall be continuous or solid, with no gaps, and shall block the line of sight to windows of neighboring dwellings. (Achievable noise reductions from fences or barriers can vary, but typically range from approximately 5 to 10 dBA, depending on construction characteristics, height, and location.)

- To the extent feasible, residential land uses located within 2,500 feet of and within the direct line of sight of major noise-generating commercial uses (e.g., loading docks and equipment/vehicle storage repair facilities,) shall be shielded from the line of sight of these facilities by construction of a noise barrier. To provide effectiveness, noise barriers shall be continuous or solid, with no gaps, and shall block the line of sight to windows of neighboring dwellings. (Achievable noise reductions from barriers can vary, but typically range from approximately 5 to 10 dBA, depending on construction characteristics, height, and location.) The applicant shall retain the services of a professional acoustician to determine the design and location of noise barriers to be constructed prior to City issuance of building permits or improvement plans.

- Dual-pane, noise-rated windows; mechanical air systems; exterior wall insulation; and other noise-reducing building materials shall be used.

- Routine testing and preventive maintenance of emergency electrical generators shall be conducted during the less sensitive daytime hours (i.e., 7 a.m. to 6 p.m.). All electrical generators shall be equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications.

In addition, the City shall seek to reduce potential long-term exposure of sensitive receptors to noise generated by project-related stationary noise sources from public activities on school grounds, in neighborhood and community parks, and in open-space areas. Specifically, the City shall encourage the controlling agencies (i.e., schools and park and recreation districts) to implement measures to reduce project-generated interior and exterior noise levels to within acceptable levels, including but not limited to the following:

- On-site landscape maintenance equipment shall be equipped with properly operating exhaust mufflers and engine shrouds, in accordance with manufacturers' specifications.

- For maintenance areas located within 500 feet of noise-sensitive land uses, the operation of on-site landscape maintenance equipment shall be limited to the least noise-sensitive periods of the day, between the hours of 7 a.m. and 7 p.m.

- Outdoor use of amplified sound systems within 500 feet of noise-sensitive land uses shall be permitted only between 7 a.m. and 10 p.m. Sunday through Thursday, and between 7 a.m. and 11 p.m. on Friday and Saturday.

Implementation: Project applicants for any particular discretionary development application.

Timing: During design review and before the approval of all subdivision maps and improvement plans, where applicable for all project phases. For measures that the City should encourage other agencies to undertake, before the approval of final maps for all project phases for noise-generating school and park and recreation sites.

Enforcement: City of Rancho Cordova Building and Safety, and Planning Departments; Cordova Recreation & Park District; Elk Grove Unified School District.

PP

The land use plan under the Proposed Project Alternative features a mix of various land uses, including residential, schools, and public/quasi-public (similar to those discussed above under the No USACE Permit Alternative), plus 39-acre and 15-acre community parks, additional acreage of commercial mixed-use (which could include offices), and an approximately 60-acre Local Town Center (commercial).

Residential

Residential-use central air conditioning units typically range from 45- to 70-dB L_{eq} at a distance of 50 feet (EPA 1971). Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the Proposed Project Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur.

Commercial

The Proposed Project Alternative includes approximately 32 acres of commercial-mixed use, which would generate the same types of noise as discussed above under the No USACE Permit Alternative, including the use of emergency generators. The Proposed Project Alternative also includes a 60-acre Local Town Center, which could include large commercial loading and unloading docks. The Local Town Center may include additional noise sources such as the use of forklifts for loading and unloading of materials, as well as the operation of hydraulic lifts, pneumatic tools, and air compressors at automotive repair facilities. Early-morning deliveries from large trucks may also be a source of elevated noise levels at nearby sensitive receptors. Noise from such equipment and activities can reach intermittent levels of up to 90 dBA at 50 feet from the source (EPA 1971). In addition, mechanical equipment (e.g., heating, ventilation, and air conditioning [HVAC] equipment) housed at the exterior of buildings is also a potential stationary source of noise, especially if these pieces of equipment are not properly enclosed. Based on this noise level, and assuming an attenuation rate of 6 dBA per doubling of distance from the source, areas within approximately 2,500 feet could experience noise levels in excess of 55 dBA.

Therefore, operational noise levels associated with the proposed commercial uses could potentially exceed the City's noise standards at nearby existing and future noise-sensitive receptors. In addition, increases in single-event noise levels, such as backup alarms from material delivery trucks and periodic testing of emergency generators, occurring during the more noise-sensitive evening and nighttime hours could result in increased levels of disturbance and sleep disruption to occupants of nearby residential dwellings. As a result, increased noise levels associated with the proposed commercial land uses are considered a **potentially significant, direct** impact. **No indirect** impacts would occur.

Public/Quasi-Public

The Proposed Project Alternative would include construction of a new fire station along Rancho Cordova Parkway south of Kiefer Boulevard that would generate high noise levels from alarms and vehicle movements when station crews respond to emergency situations. Noise levels associated with the operation of emergency activities are exempt from the City of Rancho Cordova Noise Ordinance and the proposed fire station is anticipated to include perimeter walls around the emergency facilities to shield noise-sensitive receptors from facility operational noise. However, emergency situations to which fire stations respond are associated with excessively high noise levels in order to alert vehicles and pedestrians of oncoming emergency vehicles. Although the City's noise ordinance exempts emergency activities, the potential to cause a temporary increase in ambient noise levels (i.e., greater than 3 dBA) exists and may be considered annoying by receptors. As a result, increased noise levels associated with the proposed public/quasi public land uses under the Proposed Project Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur.

Schools and Neighborhood Parks

The Proposed Project Alternative includes approximately 111 acres of schools and approximately 91 acres of neighborhood parks. School and neighborhood park noise sources would be the same as those described above, and would typically include adults' and children's' voices; opening and closing of vehicle doors in parking lots; use of landscape maintenance equipment; mechanical noise associated with building ventilation systems; car alarms; amplification of music; and noise from nighttime sporting events such as elevated voices from crowds, exterior public-address systems, and musical instruments. Noise levels may exceed the City noise standards at nearby sensitive receptors, and activities occurring during the more noise-sensitive evening and nighttime hours may result in increased levels of annoyance and sleep disruption for occupants of nearby residential dwellings. Therefore, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur.

Community Parks

The Proposed Project Alternative includes a 39-acre and 15-acre community park adjacent to the proposed high school/middle school and west of Americanos Boulevard, respectively. Uses at the 39-acre community park could include six sports fields (four lighted fields) for soccer, softball and baseball, a synthetic turf soccer field, indoor aquatic center, water feature, picnic areas, and a building containing restrooms, concessions, and storage. Uses at the 15-acre community park would be expected to include sports fields, picnic areas, restrooms, concessions, and storage. The same types of noise sources would occur at the community parks as are described for the neighborhood parks, above. It is also assumed that the lighted sports fields would be active during nighttime hours and may have the potential to exceed the City's nighttime performance standards of 40 dBA L_{eq} (Table 3.11-5). This is considered a **direct**, **potentially significant** impact. **No indirect** impacts would occur.

Mitigation Measure: Implement Mitigation Measure 3.11-3.

BIM

Residential

The Biological Impact Minimization Alternative would construct approximately 466 fewer residential units as compared to the Proposed Project Alternative. However, the types of residential noise sources would be the same as those described above. Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the Biological Impact Minimization Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Commercial

The biological Impact Minimization Alternative does not include any type of commercial land uses. Therefore, **no direct** or **indirect** impacts would occur. ***[Lesser]***

Public/Quasi-Public

The Biological Impact Minimization Alternative would construct approximately 4 acres of public/quasi public land uses, as compared to approximately 13 acres under the Proposed Project Alternative; however, the types of noise sources would be the same as those discussed above. Noise levels associated with the operation of the proposed fire station would be exempt from the City of Rancho Cordova Noise Ordinance and the proposed fire station is anticipated to include perimeter walls around the emergency facilities to shield noise-sensitive receptors from facility operational noise. However, emergency situations to which fire stations respond are associated with excessively high noise levels in order to alert vehicles and pedestrians of oncoming emergency vehicles. Although the City's noise ordinance exempts emergency activities, the potential to cause a temporary increase in ambient noise levels (i.e., greater than 3 dBA) exists and may be considered annoying by receptors. As a result, increased noise levels associated with the proposed public/quasi public land uses under the Biological Impact Minimization Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Similar]***

Schools and Neighborhood Parks

The Biological Impact Minimization Alternative would construct a similar acreage of neighborhood parks, but only about half as many acres of schools, as compared to the Proposed Project Alternative. However, the types of school and park noise sources would be the same as those described above, and would typically include adults' and children's' voices; opening and closing of vehicle doors in parking lots; use of landscape maintenance equipment; mechanical noise associated with building ventilation systems; car alarms; amplification of music; and noise from nighttime sporting events such as elevated voices from crowds, exterior public-address systems, and musical instruments. Noise levels may exceed the City noise standards at nearby sensitive receptors, and activities occurring during the more noise-sensitive evening and nighttime hours may result in increased levels of annoyance and sleep disruption for occupants of nearby residential dwellings. Therefore, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Community Parks

The Biological Impact Minimization Alternative includes two community parks in the same locations as the Proposed Project Alternative, although with slightly smaller acreages. The types of noise sources at the community parks would be the same as those described above. Because noise from the community parks may have the potential to exceed the City's noise standards, this is considered a **direct**, **potentially significant** impact. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.11-3.

CS

Residential

Under the Conceptual Strategy Alternative, a similar amount of residential dwelling units on a similar amount of acres would be constructed as compared to the Proposed Project Alternative. The types of residential noise sources would be the same as those described above. Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the Conceptual Strategy Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Commercial

The Conceptual Strategy Alternative includes a total of only 10.9 acres of commercial mixed-uses (as compared to approximately 32 acres under the Proposed Project Alternative), and the 60-acre Local Town Center would not be constructed under this alternative. Noise levels from commercial central air conditioning units, from limited volumes of small delivery vehicle traffic at small loading/unloading areas, and periodic testing of emergency generators associated with the proposed commercial mixed-use land uses under the Conceptual Strategy Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Public/Quasi-Public

The Conceptual Strategy Alternative would construct approximately 7 acres of public/quasi public land uses, as compared to approximately 13 acres under the Proposed Project Alternative; however, the types of noise sources would be the same as those discussed above. Noise levels associated with the operation of the proposed fire station would be exempt from the City of Rancho Cordova Noise Ordinance and the proposed fire station is anticipated to include perimeter walls around the emergency facilities to shield noise-sensitive receptors from facility operational noise. However, emergency situations to which fire stations respond are associated with excessively high noise levels in order to alert vehicles and pedestrians of oncoming emergency vehicles. Although the City's noise ordinance exempts emergency activities, the potential to cause a temporary increase in ambient noise levels (i.e., greater than 3 dBA) exists and may be considered annoying by receptors. As a result, increased noise levels associated with the proposed public/quasi public land uses under the Conceptual Strategy Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Similar]***

Schools and Neighborhood Parks

The Conceptual Strategy Alternative would construct a similar acreage of neighborhood parks and schools as compared to the Proposed Project Alternative. The types of school and park noise sources would be the same as those described above, and would typically include adults' and children's' voices; opening and closing of vehicle doors in parking lots; use of landscape maintenance equipment; mechanical noise associated with building ventilation systems; car alarms; amplification of music; and noise from nighttime sporting events such as elevated voices from crowds, exterior public-address systems, and musical instruments. Noise levels may exceed the City noise standards at nearby sensitive receptors, and activities occurring during the more noise-sensitive evening and nighttime hours may result in increased levels of annoyance and sleep disruption for occupants of nearby residential dwellings. Therefore, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Similar]***

Community Parks

The Conceptual Strategy Alternative includes two community parks in the same locations as the Proposed Project Alternative, although with slightly smaller acreages. The types of noise sources at the community parks would be the same as those described above. Because noise from the community parks may have the potential to exceed the City's noise standards, this is considered a **direct**, **potentially significant** impact. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.11-3.

ID

Residential

Under the Increased Development Alternative, 253 more acres of residential housing and approximately 701 more residential units would be constructed as compared to the Proposed Project Alternative. However, the types of residential noise sources would be the same as those described above. Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the Conceptual Strategy Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Greater]***

Commercial

The Increased Development Alternative includes a total of only 17.7 acres of commercial mixed-uses (as compared to approximately 32 acres under the Proposed Project Alternative), and the 60-acre Local Town Center would not be constructed under this alternative. Noise levels from commercial central air conditioning units, from limited volumes of small delivery vehicle traffic at small loading/unloading areas, and periodic testing of emergency generators associated with the proposed commercial mixed-use land uses under the Increased Development Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Public/Quasi-Public

The Increased Development Alternative would not include construction of any public/quasi-public land uses. Therefore **no direct** or **indirect** impacts would occur. ***[Lesser]***

Schools and Neighborhood Parks

The Increased Development Alternative would construct a similar acreage of neighborhood parks and schools as compared to the Proposed Project Alternative; however, the joint middle school/high school would not be constructed. The types of school and park noise sources would be the same as those described above, and would typically include adults' and children's' voices; opening and closing of vehicle doors in parking lots; use of landscape maintenance equipment; mechanical noise associated with building ventilation systems; and car alarms. However, because the joint middle school/high school would not be constructed under this alternative, amplification of music; and noise from nighttime sporting events such as elevated voices from crowds, exterior public-address systems, and musical instruments, would not be expected to occur. Nevertheless, noise levels from landscape maintenance equipment and mechanical noise associated with building ventilation systems may exceed the City noise standards at nearby sensitive receptors. Therefore, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Community Parks

The Increased Development Alternative includes two community parks, although in different locations and on slightly smaller acreages, as compared the Proposed Project Alternative. However, the types of noise sources at the community parks would be the same as those described above. Because noise from the community parks may have the potential to exceed the City's noise standards, this is considered a **direct**, **potentially significant** impact. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.11-3.

Compliance with the City Noise Ordinance and implementation of additional mitigation measures for the control of stationary-source noise as identified above in Mitigation Measure 3.11-3, would reduce stationary-source noise levels under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level.

IMPACT 3.11-4	**Project-Generated Increases in Traffic Noise Levels on Area Roadways**. *Project implementation would result in long-term increases in average daily traffic volumes on affected roadway segments. Increased traffic volumes would result in a substantial (e.g., 3 dB L_{dn}/CNEL) increase in ambient noise levels on- and off-site at nearby noise-sensitive receptors.*

NP

Because no new traffic would be generated under the No Project Alternative, traffic noise levels on area roadways would not increase; thus, **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP

Project implementation would result in an increase in ADT volumes on affected roadway segments and, consequently, an increase in traffic source noise. To assess this impact, traffic noise levels associated with the project under existing no project and plus project conditions were predicted for affected roadway segments using FHWA's Highway Noise Prediction Model (FHWA-RD-77-108) (FHWA 1978) and traffic data (e.g., ADT volumes, vehicle speeds, and percent distribution of vehicle types) from Fehr & Peers (see Section 3.15, "Traffic and Transportation"). This model is based on the CALVENO reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors and does not assume any natural or human-made shielding (e.g., the presence of vegetation, berms, walls, or buildings).

The project's contribution to the existing traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic. Table 3.11-9 summarizes the CNEL/L_{dn} at 50 feet from the centerline of the near travel lane of area roadways for baseline conditions, with and without buildout of the project. In Table 3.11-9, those modeled increases that would be considered substantial (i.e., a 3-dB L_{dn}/CNEL increase) in comparison to existing no project conditions are indicated in bold. Table 3.11-9 also shows the net difference in roadside noise levels for all the project alternatives analyzed. Modeled roadway noise levels assume no natural or artificial shielding between the roadway and the receptor. A noticeable increase of 3 dBA (CNEL/L_{dn}) would typically occur with a doubling of roadway traffic volumes.

As shown in Table 3.11-9, traffic generated under baseline conditions by the No USACE Permit Alternative would not contribute a substantial increase in traffic noise along project area roadways. As shown in Table 3.11-9, traffic noise level increases under the No USACE Permit Alternative range from 0.0 to 2.2 dBA. As a result, this **direct** impact would be **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

PP

As shown in Table 3.11-9, traffic noise level increases from the Proposed Project Alternative under baseline conditions range from 0.0 to 2.9 dBA. However, there would not be enough additional trips to result in noise level increases of 3 dBA or higher under this alternative. As a result, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur.

Mitigation Measure: No mitigation measures are required.

BIM

Under the Biological Impact Minimization Alternative, there would be slightly fewer trips generated on area roadways than under the Proposed Project Alternative. As shown in Table 3.11-9, traffic noise level increases from the Biological Impact Minimization Alternative under baseline conditions ranges from 0.0 to 2.6 dBA. There would not be enough additional trips to result in noise level increases of 3 dBA or higher under this alternative. As a result, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

CS

Under the Conceptual Strategy Alternative, there would be slightly fewer trips generated on area roadways than under the Proposed Project Alternative. As shown in Table 3.11-9, traffic noise level increases from the Conceptual Strategy Alternative under baseline conditions range from 0.0 to 2.6 dBA. There would not be enough additional trips to result in noise level increases of 3 dBA or higher under this alternative. As a result, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

ID

Under the Increased Development Alternative, a slightly higher number of trips would be generated on area roadways than under the Proposed Project Alternative. As shown in Table 3.11-9, traffic noise level increases from the Increased Development Alternative under baseline conditions range from 0.0 to 2.7 dBA. There would not be enough additional trips to result in noise level increases of 3 dBA or higher under this alternative. As a result, this **direct** impact is considered a **less than significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

Table 3.11-9
Summary of Modeled Baseline Traffic Noise Levels

Roadway Segment	Between		Predicted Noise Level (dBA CNEL/L_{dn}) at 50 Feet from Near Travel Lane Centerline										
			NP	NCP	Δ in dB	PP	Δ in dB	BIM	Δ in dB	CS	Δ in dB	ID	Δ in dB
SR 16	Excelsior Road	Eagles Nest Road	71.3	72.7	1.4	73.0	1.7	72.6	1.3	72.6	1.3	72.8	1.5
SR 16	Sunrise Boulevard	Grant Line Road	72.1	72.4	0.3	72.5	0.4	72.6	0.5	72.5	0.4	72.5	0.4
Kiefer Boulevard	Grant Line Road	north of SR 16	57.9	58.4	0.5	58.8	0.9	58.4	0.5	58.4	0.5	58.4	0.5
Mather Boulevard	Femoyer Street	Douglas Road	70.3	71.3	1.0	71.5	1.2	71.3	1.0	71.4	1.1	71.6	1.3
Douglas Road	Mather Boulevard	Sunrise Boulevard	69.8	71.1	1.3	71.4	1.6	71.1	1.3	71.1	1.3	71.4	1.6
International Drive	South White Rock Road	Zinfandel Drive	68.8	68.9	0.1	68.9	0.1	68.8	0.0	68.9	0.1	68.9	0.1
International Drive	Zinfandel Drive	Kilgore Road	66.3	66.5	0.2	66.6	0.3	66.5	0.2	66.5	0.2	66.6	0.3
White Rock Road	Zinfandel Drive	Sunrise Boulevard	71.8	72.2	0.4	72.2	0.4	72.2	0.4	72.2	0.4	72.2	0.4
White Rock Road	Sunrise Boulevard	Grant Line Road	66.8	66.9	0.1	66.9	0.1	66.9	0.1	66.9	0.1	66.9	0.1
Folsom Boulevard	Zinfandel Drive	Sunrise Boulevard	71.1	71.1	0.0	71.1	0.0	71.1	0.0	71.1	0.0	71.2	0.1
Folsom Boulevard	Sunrise Boulevard	Hazel Avenue	69.3	69.3	0.0	69.3	0.0	69.3	0.0	69.3	0.0	69.3	0.0
Mather Field Road	Folsom Boulevard	U.S. 50 westbound ramps	73.5	73.6	0.1	73.6	0.1	73.6	0.2	73.6	0.2	73.6	0.1
Mather Field Road	U.S. 50 eastbound ramps	International Drive	75.0	75.3	0.3	75.4	0.4	75.3	0.3	75.3	0.3	75.4	0.4
Zinfandel Drive	Folsom Boulevard	U.S. 50 westbound ramps	71.6	71.7	0.1	71.7	0.1	71.7	0.1	71.7	0.1	71.8	0.2
Zinfandel Drive	US 50 eastbound ramps	White Rock Road	74.3	74.4	0.1	74.4	0.1	74.3	0.0	74.4	0.1	74.4	0.1
Zinfandel Drive	White Rock Road	International Drive	71.0	71.0	0.0	71.0	0.0	71.0	0.0	71.0	0.0	71.0	0.0
Sunrise Boulevard	Gold Country Boulevard	Coloma Road	76.7	76.9	0.2	77.0	0.3	76.9	0.2	76.9	0.2	76.9	0.2
Sunrise Boulevard	Coloma Road	U.S. 50 westbound ramps	76.6	76.8	0.2	76.9	0.3	76.8	0.2	76.8	0.2	76.8	0.2
Sunrise Boulevard	U.S. 50 eastbound ramps	Folsom Boulevard	75.4	75.8	0.4	75.9	0.5	75.7	0.3	75.8	0.4	75.8	0.4
Sunrise Boulevard	Folsom Boulevard	White Rock Road	74.4	74.9	0.5	75.0	0.6	74.9	0.5	74.9	0.5	75.0	0.6
Sunrise Boulevard	White Rock Road	Douglas Road	74.0	75.3	1.3	75.4	1.4	75.2	1.2	75.2	1.2	75.4	1.4
Sunrise Boulevard	SR 16	Grant Line Road	69.7	70.6	0.9	71.1	1.4	70.4	0.7	70.5	0.8	70.7	1.0
Hazel Avenue	Winding Way	U.S. 50 westbound ramps	75.4	75.4	0.0	75.4	0.0	75.4	0.0	75.4	0.0	75.4	0.0
Grant Line Road	White Rock Road	Douglas Road	68.2	70.3	2.1	70.9	2.7	70.4	2.2	70.6	2.4	70.6	2.4
Grant Line Road	Douglas Road	SR 16	67.4	69.6	2.2	70.3	2.9	70.0	2.6	70.0	2.6	70.1	2.7
Grant Line Road	SR 16	Sunrise Boulevard	66.6	68.4	1.8	68.7	2.1	68.5	1.9	68.5	1.9	68.5	1.9
Douglas Road	Sunrise Boulevard	Rancho Cordova Parkway	70.5	72.7	2.2	72.3	1.8	72.5	2.5	72.8	2.3	73.0	2.5
Douglas Road	Americanos Boulevard	Grant Line Road	65.7	66.3	0.6	65.7	0.0	66.5	0.8	67.5	1.8	66.6	0.9
Sunrise Boulevard	Douglas Road	Kiefer Boulevard	73.6	74.4	0.8	74.8	1.2	74.5	0.9	74.4	0.8	74.6	1.0
Sunrise Boulevard	Kiefer Boulevard	SR 16	72.8	73.9	1.1	74.4	1.6	73.5	0.7	73.5	0.7	73.8	1.0

Notes: dBA = A-weighted decibels; CNEL = community noise equivalent level; L_{dn} = day-night average noise level; NP = No Project Alternative; NCP = No USACE Permit Alternative; Δ in dB = change in decibels; PP = Proposed Project Alternative; BIM = Biological Impact Minimization Alternative; CS = Conceptual Strategy Alternative; ID = Increased Development Alternative; SR = State Route; U.S. 50 = U.S. Highway 50; FHWA = Federal Highway Administration.

Traffic noise levels were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis prepared for this project (see Section 3.15, "Traffic and Transportation"). Modeling assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).

Source: Modeled by AECOM in 2010

IMPACT 3.11-5 **Compatibility of Proposed On-Site Land Uses with the Ambient Noise Environment**. *The project includes development of on-site noise-sensitive land uses that could be exposed to noise levels that exceed the noise standards set forth in the City's General Plan Noise Element.*

NP

Because no new project-related sensitive receptors would be generated under the No Project Alternative, no sensitive receptors would be exposed to noise generated from existing stationary- or roadway-source noise; thus, **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, BIM, CS, ID

Off-Site Stationary Noise Sources

There are no stationary sources in the project vicinity that would have the potential to affect the ambient noise environment of proposed on-site sensitive receptors. Kiefer Landfill and the Sacramento Rendering Company are sources of considerable stationary noises. However, the landfill is located approximately 7,000 feet southeast of the project site and the primary noise-generating activities are shielded by intervening topography. The rendering plant is located 2,000 feet to the west of the SPA and was not observed to produce audible noise on the SPA during AECOM field visits. Therefore, **no direct** or **indirect** impact would occur. ***[Similar]***

Exterior Traffic Noise Levels

As discussed above, ambient noise levels in the SPA would be influenced largely by vehicle traffic on area roadways. Predicted traffic noise levels within the project site were calculated using the FHWA Noise Prediction Model (FHWA-RD-77-108) based on traffic information (i.e., average daily traffic, vehicle speeds, roadway width) obtained from the traffic analysis prepared by Fehr & Peers for this project (see Section 3.15, "Transportation and Traffic"). Input data used in the model included average daily traffic levels for nearby area roadways, day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths and does not assume any natural or human-made shielding (e.g., the presence of vegetation, berms, walls, or buildings). Traffic noise levels were calculated for future conditions with and without buildout of the project alternatives; these noise levels are summarized in Table 3.11-11.

The 60-dBA CNEL noise contours for adjacent roadways (i.e., Sunrise Boulevard, Kiefer Boulevard, and Grant Line Road) and on-site proposed roadways (i.e., Rancho Cordova Parkway, Chrysanthy Road, and Americanos Boulevard) extend onto portions of the SPA, including areas of proposed single-family and multifamily residential development (see Table 3.11-11). Predicted on-site noise levels at residential dwellings located within these projected noise contours could potentially exceed the City's land-use compatibility standard of 60-dBA CNEL. Thus, on-site noise levels at residential dwellings within the 60-dBA CNEL noise contours for adjacent roadways may be within the 60-dBA CNEL contour, and therefore, this **direct** impact is considered **significant**. **No indirect** impacts would occur. ***[Similar]***

Interior Traffic Noise Levels

Interior noise levels may exceed the City's interior noise standard of 45-dBA CNEL due to traffic noise. Preliminary interior noise analyses indicate that the first row of houses along Rancho Cordova Parkway, Americanos Boulevard, Sunrise Boulevard, and Grant Line Road may be exposed to noise levels in excess of 70-dBA CNEL. Typical construction requirements (wood siding or two-coat stucco, STC-26 windows, door weather-stripping, exterior wall insulation, composition plywood roof) provide an exterior-to-interior noise reduction of approximately 25 dBA with windows closed and 15 dBA with windows open. Second and third floor façades would typically be exposed to noise levels of approximately 2-3 dB higher than those at first floor façades.

It is expected that first, second, and third floor façades would require window assembly upgrades to comply with the City's interior traffic noise level standard. Based on the noise levels shown in Table 3.11-11, building façades located along Rancho Cordova Parkway, Americanos Boulevard, Sunrise Boulevard, and Grant Line Road would require window assemblies to have higher Sound Transmission Class ratings (STC) than typical construction requirements. Thus, on-site interior noise levels at second and third floor façades of residential dwellings within the 70-dBA CNEL noise contours for adjacent roadways would be considered a **significant** impact. **No indirect** impacts would occur. ***[Greater]***

Mitigation Measure: Implement Mitigation Measure 3.11-3.

Mitigation Measure 3.11-5: Implement Measures to Improve Land Use Compatibility with Noise Sources.

To meet City noise standards set forth in the City General Plan and Noise Ordinance and improve compatibility between project land uses and noise sources, the project applicants for any particular discretionary development application for all project phases shall implement the following:

- Obtain the services of a qualified acoustical consultant to develop noise attenuation measures for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms) that will provide a minimum composite Sound Transmission Class (STC) rating for buildings of 30 or greater, individually computed for the walls and the floor/ceiling construction of buildings, for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms).
- When a project alternative is adopted, and prior to the submittal of small-lot tentative subdivision maps and improvement plans, the project applicants shall conduct a site-specific acoustical analysis to determine predicted roadway noise impacts attributable to the project, taking into account site-specific conditions (e.g., site design, location of structures, building characteristics). The acoustical analysis shall evaluate stationary- and mobile-source noise attributable to the proposed use or uses and impacts on nearby noise-sensitive land uses, in accordance with adopted City noise standards. For any noise impacts identified in the acoustical analysis that would be greater than City noise standards, the project applicant shall submit a noise reduction plan to reduce any identified impacts above adopted City noise standards. The noise reduction plan shall be reviewed and approved by the City and its implementation shall be required as a condition of approval of tentative maps or improvement plans. Feasible measures to be included in the noise reduction plan to reduce project-related noise impacts may include, but are not limited to, the following:
    - limiting noise-generating operational activities associated with proposed commercial land uses, including truck deliveries;
    - construction of exterior sound walls;
    - use of "quiet pavement" (e.g., rubberized asphalt) construction methods; or
    - use of increased noise-attenuation measures in building construction (e.g., dual-pane, sound-rated windows; exterior wall insulation); and
    - installation of noise barriers ranging from 6 to 14 feet in height to reduce exterior noise levels to the normally acceptable noise standard of 60 dBA CNEL at noise-sensitive locations. Noise barriers in excess of 10 feet may not be considered desirable or feasible.

Where noise barrier heights are not feasible, the City may, at its discretion, require the project applicant to instead achieve the conditionally-acceptable noise level of 65-dBA CNEL at noise-sensitive locations, provided that interior noise levels are in compliance with the City's 45-dBA L_{dn} interior noise level standard. Noise barriers ranging from 6 to 10 feet in height would be required to reduce exterior noise levels to a conditionally acceptable level of 65-dBA CNEL at noise-sensitive locations relative to the corresponding roadway segment.

As an alternative, site design may be taken into consideration to reduce noise levels within compliance of applicable noise standards. Where noise levels require sound walls in excess of a desirable height deemed by the City, residential areas may be redesigned so that houses front the noise source. For example, fronting the residences to the noise source would achieve a 5-dBA to 8-dBA reduction in traffic noise levels due to shielding provided by the intervening residential building facade at the outdoor activity area. Another alternative would be to increase minimum setback distances from the noise source.

Implementation: Project applicants of any particular discretionary development application.

Timing: Before the recordation of final maps and during all project construction activities for all project phases where applicable.

Enforcement: City of Rancho Cordova Planning Department.

PP

Noise levels within the project site are influenced largely by vehicle traffic on area roadways. The compatibility of proposed land uses, based on City criteria, with respect to vehicle traffic under the Proposed Project Alternative is discussed below. Detailed site plans showing grading elevations, roadway alignments, and pad locations were only available for the Proposed Project Alternative during this analysis. To evaluate recommended barrier heights, the TNM was utilized for the Proposed Project Alternative to represent a three-dimensional noise model that accounts for distance, ground surface parameters, meteorological conditions, roadway speeds, and vehicle percentages. The preliminary barrier analysis assumes all outdoor activity areas are located adjacent to the relative roadway segment. Assumptions for roadway width, roadway vehicle speed, minimum residential setback distances, and outdoor activity areas were based on the Draft SunCreek Specific Plan (attached as Appendix C). Note that the Proposed Project Alternative includes a 60-acre Local Town Center along Grant Line Road; therefore, no on-site project-generated sensitive receptors would be placed along Grant Line Road under this alternative.

Exterior Traffic Noise Levels—"Traffic Noise Model"

The TNM is a computer model for highway traffic noise prediction and analysis that computes traffic noise at nearby noise-sensitive receptors and aids in the design of noise abatement. As part of TNM's computations, noise source inputs include automobiles, medium trucks, heavy trucks, buses, and motorcycles. Noise emission levels calculated by TNM consist of A-weighted sound levels.

The Proposed Project Alternative was modeled in TNM based on available data and assumptions. Coordinates for roadways, receivers, building rows, and terrain were estimated using the Contour Grading Plan (MacKay & Somps 2008) for the proposed SunCreek Specific Plan, which showed the location of parcel lines and roadway right-of-ways. Roadway widths were assumed to be 24 feet (two lanes in each direction) for the entire project site and all intersections were considered to be signalized. To estimate the worst-case noise levels, receivers were only modeled along the first row of buildings. Traffic volumes were taken from the traffic impact analysis performed by Fehr & Peers in 2010. Local roadways traffic volumes were taken from forecast models provided in 2007 by Fehr & Peers. Speeds along roadways were conservatively assumed to be 50 miles per hour (mph) for automobiles and 45 mph for trucks.

CNEL (L_{den}) noise levels were calculated for each sensitive receptor on the project site. The default TNM values for day, evening, and night percentages were used, and the truck percentages were assumed to be 2% for medium trucks (double axel vehicles) and 1% for heavy trucks (multi-axel vehicles). Lastly, for sensitive receptors where the noise levels would be 65 dBA or more, noise barriers were modeled and evaluated at heights ranging from 6 to 10 feet. The noise barriers were modeled either along parcel lines.

Based on the TNM modeling, noise barriers were determined to be needed along the specific roadways and would require the following barrier height ranges to achieve the City's conditionally acceptable exterior noise level standard of 65-dBA L_{dn}/CNEL:

- Sunrise Boulevard: 8 feet tall.
- Kiefer Boulevard: 6 to 10 feet tall.
- Rancho Cordova Parkway: 6 to 8 feet tall.
- Chrysanthy Road: 6 feet to 8 feet tall.
- Americanos Boulevard: 8 feet to 10 feet tall.
- Crescent Drive: 6 to 8 feet tall.
- Central Park Drive: 6 feet tall.
- North Campus Drive: 6 to 10 feet tall.

It should be noted that multiple-family residential land uses identified along Rancho Cordova Parkway and Americanos Boulevard were identified in TNM as experiencing noise levels that would exceed City standards (65-dBA L_{dn} at outdoor areas when directly adjacent to roadways). However, these multiple family residences were assumed to consist of multiple floors (two-stories or greater) with the common outdoor activity area being located in the center of the proposed complexes. Therefore, it may be possible for the multi-family structures to provide adequate shielding at the common outdoor activity area and such that this construction would comply with City noise standards. Because modeling for the Proposed Project Alternative has demonstrated that noise barriers would be needed in order achieve compliance with City noise standards, this **direct** impact is considered **significant**. **No indirect** impacts would occur.

Interior Traffic Noise Levels

Interior noise levels may exceed the City's interior noise standard of 45-dBA CNEL due to traffic noise. Preliminary interior noise analyses indicate that the first row of houses along Rancho Cordova Parkway, Americanos Boulevard, and Sunrise Boulevard may be exposed to noise levels in excess of 70-dBA CNEL. Typical construction requirements (wood siding or two-coat stucco, STC-26 windows, door weather-stripping, exterior wall insulation, composition plywood roof) provide an exterior-to-interior noise reduction of approximately 25 dBA with windows closed and 15 dBA with windows open. Second and third floor façades would typically be exposed to noise levels of approximately 2-3 dB higher than those at first floor façades.

It is expected that first, second, and third floor façades would require window assembly upgrades to comply with the City's interior traffic noise level standard. Based on the noise levels shown in Table 3.11-10, building façades located along Rancho Cordova Parkway, Americanos Boulevard, and Sunrise Boulevard would require window assemblies to have higher Sound Transmission Class ratings (STC) than typical construction requirements. Thus, on-site interior noise levels of residential dwellings within the 70-dBA CNEL noise contours for adjacent roadways would be considered a **direct, significant** impact. **No indirect** impacts would occur.

Mitigation Measure: Implement Mitigation Measures 3.11-3 and 3.11-5.

Implementation of Mitigation Measure 3.11-3 and 3.11-5 would be effective in reducing the significant interior and exterior noise level impacts of the proposed development to **less-than-significant** levels under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives because the installation of noise barriers, inclusion of higher STC-rated window assemblies of second and third floor façades within the 70-dBA L_{dn} traffic noise contour, or other alternatives such as site redesign or setbacks, would reduce traffic noise levels to City standards at affected receptors.

Table 3.11-10 Representative Vibration Source Levels for Construction Equipment		
Equipment	**PPV at 25 feet (in/sec)[1]**	**Approximate L_v (VdB) at 25 feet[2]**
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Notes:

[1] Where PPV is the peak particle velocity.

[2] Where Lv is the root mean square velocity expressed in vibration decibels (VdB), assuming a crest factor of 4.

Source: FTA 2006

IMPACT 3.11-6 **Possible Exposure of Sensitive Receptors to Groundborne Noise and Vibration Levels Caused by Construction Activities.** *Implementation of the project could result in exposure of sensitive noise receptors to groundborne noise and vibration levels that exceed the Federal Transit Administration and Caltrans guidelines.*

NP

Because no new project-related sensitive receptors would be generated under the No Project Alternative, no sensitive receptors would be exposed to groundborne noise and vibration; thus, **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, PP, BIM, CS, ID

Construction activities have the potential to result in varying degrees of temporary ground vibration depending on the specific construction equipment used and operations involved. Ground vibration levels associated with various types of construction equipment are summarized in Table 3.11-10. Based on the representative vibration levels identified for various construction equipment types, sensitive receptors located near construction activities could be exposed to groundborne vibration levels exceeding the recommended FTA and Caltrans guidelines of 80 VdB and 0.2 in/sec PPV, respectively.

A groundborne noise and vibration-sensitive receptor would need to be located within 100 feet from vibration-induced construction activities in order to perceive noticeable (greater than 80 VdB or 0.2 in/sec PPV) groundborne noise or vibration. Groundborne noise and vibration levels were predicted based on VdB and PPV reference vibration levels shown in Table 3.11-10. Based on the phasing and location of development on the project site, vibration-induced construction activities could exceed recommended Caltrans standard of 0.2 in/sec PPV regarding the prevention of structural damage for normal buildings or FTA's maximum acceptable vibration standard of 78 VdB regarding human response (i.e., annoyance) at nearby vibration-sensitive land uses (i.e., residences and schools). Consequently, this **direct** impact is considered **significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.11-6: Implement Measures to Prevent Exposure of Sensitive Receptors to Temporary Construction-Generated Groundborne Noise and Vibration.

To reduce impacts associated with groundborne noise and vibration generated during construction activities, the project applicants for all project phases shall conform to the following requirements:

- To the extent feasible, bulldozing operations shall occur greater than 100 feet from occupied vibration-sensitive receptors (e.g., residences, schools).
- All construction equipment and equipment staging areas shall be located as far as feasible from nearby vibration-sensitive land uses.

Implementation: Project applicants of any particular discretionary development application.

Timing: During all phases of project construction.

Enforcement: City of Rancho Cordova Planning Department.

Implementation of Mitigation Measure 3.11-6 would reduce potentially significant impacts from temporary construction groundborne noise and vibration to a **less-than-significant** level under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives because construction would be required to occur 100 feet from occupied, vibration-sensitive receptors, to the extent feasible, to ensure Caltrans and FTA standards are met.

3.11.4 RESIDUAL SIGNIFICANT IMPACTS

Impacts associated with increased noise and vibration from construction-related activities and increased noise levels from additional roadway traffic and from operation of stationary noise sources would be reduced to less-than-significant levels with implementation of mitigation recommended in this section. Therefore, there are no residual significant impacts.

3.11.5 CUMULATIVE IMPACTS

When determining whether the overall noise (and vibration) impacts from related projects would be cumulatively significant and whether the project's incremental contribution to any significant cumulative impacts would be cumulatively considerable, it is important to note that noise and vibration are localized occurrences; as such, they decrease rapidly in magnitude as the distance from the source to the receptor increases. Therefore, only those related projects that are in the direct vicinity of the SPA and those that are considered influential in regards to noise and vibration (e.g., not located where ambient conditions are dominated by traffic noise from U.S. 50 and relatively large in size) would have the potential to be considered in a cumulative context with the project's incremental contribution (e.g., Sunrise Douglas Community Plan area, Arboretum, Cordova Hills, Kiefer Landfill Special Planning Area, and the Teichert, Stoneridge, and DeSilva Gates quarries).

Temporary, Short-Term Exposure of Sensitive Receptors to Increased Equipment Noise from Construction

The City's noise regulations limit construction activities to daytime hours. However, it is anticipated that compliance with these regulations alone would not avoid significant construction-noise impacts associated with the related projects because of the anticipated substantial increase in ambient noise levels for existing and future adjacent sensitive receptors to construction areas during daytime hours. Therefore, significant cumulative noise impacts associated with construction activities could occur from continued construction phasing of the SunCreek project and the adjacent related projects. Any of the project within the Sunrise Douglas Community Plan area (labeled as projects 10 through 21 on Exhibit 3.0-1 in Section 3.0, "Approach to the Environmental Analysis and the Cumulative Context), the proposed Arboretum and Cordova Hills projects, and new development in the Kiefer Landfill Special Planning Area, are all close enough to the SPA to have an additive effect from construction noise sources. Although implementation of Mitigation Measure 3.11-1 would reduce project-related construction-noise impacts to a less-than-significant level, it cannot be assumed that the aforementioned projects would include mitigation measures to reduce those related projects' contribution to cumulative construction noise impacts.

Therefore, the project could result in a cumulatively considerable incremental contribution to significant cumulative noise impacts from construction noise.

Temporary, Short-Term Exposure of Sensitive Receptors to Potential Groundborne Noise and Vibration from Construction

As discussed in Impact 3.11-6, construction of the project would result in a significant impact from temporary, short-term groundborne noise and vibration levels in the immediate vicinity and possibly during the same time frame as the related projects. Groundborne noise and vibration levels from construction of the aforementioned related projects would be similar in nature and magnitude to those discussed above in Impact 3.11-6. Specifically, construction activities would result in varying degrees of temporary groundborne noise and vibration, depending on the specific construction equipment used and activities involved (see, for example, Table 3.11-11). Although detailed information is not currently available, construction of the related projects would be anticipated to result in maximum groundborne noise and vibration levels associated with bulldozing activities. According to FTA, levels associated with the use of a large bulldozer is 0.089 in/sec PPV (87 VdB) at 25 feet. With respect to the prevention of structural damage, bulldozing would not exceed the Caltrans-recommended level of 0.2 in/sec PPV even at a distance of 25 feet. However, with respect to prevention of human disturbance, bulldozing could exceed the FTA-recommended level of 78 VdB within 50 feet. The exact locations of bulldozing activities on the SPA have not been determined at this time. The proposed Arboretum and Cordova Hills projects and new development in the Kiefer Landfill Special Planning Area are all close enough to the SPA to have an additive effect. Although implementation of Mitigation Measure 3.11-6 would reduce project-related groundborne noise and vibration impacts to a less-than-significant level, it cannot be assumed that the aforementioned projects would include mitigation measures to reduce those related projects' contribution to cumulative short-term increases in groundborne noise and vibration levels. Nearby sensitive receptors could be located within the distances modeled above that are correlated with the Caltrans- and FTA-recommended exceedance levels; therefore, the related projects could result in a significant impact from short-term exposure of sensitive receptors to potential groundborne noise and vibration. Thus, the incremental contribution of the project to this significant cumulative impact could be cumulatively considerable.

Long-Term Exposure of Sensitive Receptors to Increased Stationary-Source Noise

Stationary-source noise associated with the SunCreek project and the related projects could potentially result in exceedance of the City's noise regulations at sensitive receptors. Implementation of Mitigation Measure 3.11-3 would reduce project-generated stationary-source noise impacts to a less-than-significant level. The noise from any stationary noise sources associated with the related projects could be controlled at the source by means of noise walls, enclosures, and site planning, but there is no guarantee that all the related projects would include such noise controls as part of their proposals. Therefore, significant cumulative noise impacts associated with stationary noise sources at the related projects could occur. Projects within the Sunrise Douglas Community Plan area and the Arboretum project are close enough to the SunCreek project site to have an additive effect from stationary noise sources. Thus, project implementation could result in a cumulatively considerable incremental contribution to significant cumulative stationary-source noise impacts.

Traffic Noise Levels

Construction noise and stationary-source noise can be controlled on-site at the point of origin; however, traffic noise may extend beyond a project site along existing and proposed off-site and on-site roadways, resulting in significant traffic noise impacts on sensitive uses along these roadways. The combined cumulative increase in traffic on area roadways would extend the 60-dBA noise contour distances for these roadway segments, causing the sensitive receptors from the related projects to fall within this contour.

Table 3.11-11
Summary of Modeled Cumulative (Future) Traffic Noise Levels Without Quarry Trucks

Roadway Segment	Between		Predicted Noise Level (dBA CNEL/Ldn) at 50 Feet from Near Travel Lane Centerline										
			NP	NCP	Δ in dB	PP	Δ in dB	BIM	Δ in dB	CS	Δ in dB	ID	Δ in dB
SR 16	Excelsior Road	Eagles Nest Road	73.6	74.1	0.5	74.3	0.7	74.0	0.4	74.0	0.4	74.2	0.6
SR 16	Sunrise Boulevard	Grant Line Road	74.2	74.3	0.1	74.6	0.2	74.3	0.1	74.3	0.1	74.4	0.2
Kiefer Boulevard	Grant Line Road	north of SR 16	63.4	63.7	0.3	64.0	0.6	63.7	0.3	63.7	0.3	63.7	0.3
Mather Boulevard	Femoyer Street	Douglas Road	72.6	73.0	0.4	73.3	0.7	73.0	0.4	73.0	0.4	73.1	0.5
Douglas Road	Mather Boulevard	Sunrise Boulevard	73.3	73.7	0.4	74.0	0.7	73.7	0.4	73.7	0.4	73.8	0.5
International Drive	South White Rock Road	Zinfandel Drive	75.9	75.9	0.0	75.9	0.0	75.9	0.0	75.9	0.0	75.9	0.0
International Drive	Zinfandel Drive	Kilgore Road	76.2	76.3	0.1	76.3	0.1	76.3	0.1	76.3	0.1	76.3	0.1
White Rock Road	Zinfandel Drive	Sunrise Boulevard	74.3	74.3	0.0	74.3	0.0	74.3	0.0	74.3	0.0	74.3	0.0
White Rock Road	Sunrise Boulevard	Grant Line Road	75.1	75.1	0.0	75.1	0.0	75.1	0.0	75.1	0.0	75.1	0.0
Folsom Boulevard	Zinfandel Drive	Sunrise Boulevard	72.6	72.6	0.0	72.6	0.0	72.6	0.0	72.6	0.0	72.6	0.0
Folsom Boulevard	Sunrise Boulevard	Hazel Avenue	72.5	72.5	0.0	72.5	0.0	72.5	0.0	72.5	0.0	72.5	0.0
Mather Field Road	Folsom Boulevard	U.S. 50 westbound ramps	75.3	75.3	0.0	75.4	0.1	75.3	0.0	75.3	0.0	75.3	0.0
Mather Field Road	U.S. 50 eastbound ramps	International Drive	77.5	77.5	0.0	77.6	0.1	77.5	0.0	77.5	0.0	77.6	0.1
Zinfandel Drive	Folsom Boulevard	U.S. 50 westbound ramps	72.9	72.9	0.0	73.0	0.1	72.9	0.0	72.9	0.0	72.9	0.0
Zinfandel Drive	U.S. 50 eastbound ramps	White Rock Road	76.9	77.0	0.1	77.0	0.1	77.0	0.1	77.0	0.1	77.0	0.1
Zinfandel Drive	White Rock Road	International Drive	74.3	74.3	0.0	74.4	0.1	74.3	0.0	74.3	0.0	74.3	0.0
Sunrise Boulevard	Gold Country Boulevard	Coloma Road	77.9	78.0	0.1	78.0	0.1	78.0	0.1	78.0	0.1	78.0	0.1
Sunrise Boulevard	Coloma Road	U.S. 50 westbound ramps	77.9	78.0	0.1	78.1	0.2	78.0	0.1	78.0	0.1	78.0	0.1
Sunrise Boulevard	U.S. 50 eastbound ramps	Folsom Boulevard	75.8	76.0	0.2	76.0	0.2	75.9	0.1	76.0	0.2	76.0	0.2
Sunrise Boulevard	Folsom Boulevard	White Rock Road	75.5	75.6	0.1	75.7	0.2	75.6	0.1	75.6	0.1	75.7	0.2
Sunrise Boulevard	White Rock Road	Douglas Road	75.3	75.7	0.4	75.9	0.6	75.7	0.4	75.7	0.4	75.8	0.5
Sunrise Boulevard	SR 16	Grant Line Road	73.4	73.7	0.3	73.9	0.6	73.6	0.2	73.6	0.2	73.8	0.4
Hazel Avenue	Winding Way	U.S. 50 westbound ramps	78.8	78.9	0.1	78.9	0.1	78.9	0.1	78.9	0.1	78.9	0.1
Grant Line Road	White Rock Road	Douglas Road	76.8	77.1	0.3	77.4	0.6	77.1	0.3	77.1	0.3	77.2	0.4
Grant Line Road	Douglas Road	SR 16	74.8	75.2	0.4	75.9	1.1	75.4	0.6	75.3	0.5	75.4	0.6
Grant Line Road	SR 16	Sunrise Boulevard	74.3	74.6	0.3	74.9	0.6	74.6	0.3	74.7	0.4	74.7	0.4
Douglas Road	Sunrise Boulevard	Rancho Cordova Parkway	73.4	74.1	0.7	74.7	1.3	74.0	0.6	74.2	0.8	74.3	0.9

Table 3.11-11
Summary of Modeled Cumulative (Future) Traffic Noise Levels Without Quarry Trucks

Roadway Segment	Between		Predicted Noise Level (dBA CNEL/Ldn) at 50 Feet from Near Travel Lane Centerline										
			NP	NCP	Δ in dB	PP	Δ in dB	BIM	Δ in dB	CS	Δ in dB	ID	Δ in dB
Douglas Road	Americanos Boulevard	Grant Line Road	71.6	71.7	0.1	71.8	0.2	71.8	0.2	71.7	0.1	71.8	0.2
Sunrise Boulevard	Kiefer Boulevard	SR 16	74.7	75.3	0.6	75.4	0.7	75.1	0.4	75.1	0.4	75.3	0.6
Douglas Road	Rancho Cordova Parkway	Americanos Boulevard	70.9	70.9	0.0	71.0	0.1	71.0	0.1	70.9	0.0	71.0	0.1
Chrysanthy Boulevard	Sunrise Boulevard	Rancho Cordova Parkway	63.7	63.8	0.1	64.0	0.3	63.8	0.1	63.8	0.1	63.8	0.1
Chrysanthy Boulevard	Rancho Cordova Parkway	Americanos Boulevard	65.0	65.3	0.3	65.7	0.7	65.3	0.3	65.4	0.4	65.4	0.4
Kiefer Boulevard	Zinfandel Drive	Sunrise Boulevard	61.3	64.7	**3.4**	65.1	**3.8**	64.4	**3.1**	64.5	**3.2**	65.1	**3.8**
Kiefer Boulevard	Sunrise Boulevard	Rancho Cordova Parkway	62.9	67.2	**4.3**	67.4	**4.5**	66.8	**3.9**	67.0	**4.1**	67.3	**4.4**
Zinfandel Drive	Mather Boulevard	Douglas Road	70.1	70.2	0.1	70.5	0.4	70.2	0.1	70.3	0.2	70.3	0.2
Zinfandel Drive	Douglas Road	Kiefer Boulevard	62.9	63.0	0.1	63.0	0.1	63.0	0.1	62.9	0.0	63.0	0.1
Zinfandel Drive	Kiefer Boulevard	SR 16	63.4	63.4	0.0	63.4	0.0	63.4	0.0	63.4	0.0	63.4	0.0
Sunrise Boulevard	Douglas Road	Chrysanthy Boulevard	72.7	73.0	0.3	73.1	0.4	72.9	0.2	72.9	0.2	73.0	0.3
Sunrise Boulevard	Chrysanthy Boulevard	Kiefer Boulevard	71.2	71.6	0.4	71.7	0.5	71.5	0.3	71.5	0.3	71.7	0.5
Rancho Cordova Parkway	U.S. 50	Easton Valley Parkway	75.8	75.9	0.1	76.0	0.2	75.9	0.1	75.9	0.1	75.9	0.1
Rancho Cordova Parkway	Easton Valley Parkway	White Rock Road	75.5	75.6	0.1	75.6	0.1	75.6	0.1	75.6	0.1	75.6	0.1
Rancho Cordova Parkway	White Rock Road	Douglas Road	70.8	71.2	0.4	71.3	0.5	71.2	0.4	71.2	0.4	71.2	0.4
Rancho Cordova Parkway	Douglas Road	Chrysanthy Boulevard	72.3	73.6	1.3	74.2	1.9	73.6	1.3	73.7	1.4	73.8	1.5
Rancho Cordova Parkway	Chrysanthy Boulevard	Kiefer Boulevard	72.6	73.2	0.6	73.4	0.8	73.1	0.5	73.1	0.5	73.3	0.7
Americanos Boulevard	Rancho Cordova Parkway	White Rock Road	72.5	72.9	0.4	73.0	0.5	72.8	0.3	72.9	0.4	72.9	0.4
Americanos Boulevard	White Rock Road	Douglas Road	71.9	72.2	0.3	72.7	0.8	72.1	0.2	72.3	0.4	72.4	0.5
Americanos Boulevard	Douglas Road	Chrysanthy Boulevard	70.3	71.2	0.9	72.1	1.8	70.9	0.6	71.3	1.0	71.3	1.0

Bold = Increase in noise (i.e., 3 dBA or greater) that results in a significant impact.

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels; FHWA = Federal Highway Administration; L_{dn} = day-night average noise level; SR = State Route; NP = No Project Alternative; NCP = No USACE Permit Alternative; PP = Proposed Project Alternative; BIM = Biological Impact Minimization Alternative; CS = Conceptual Strategy Alternative; ID = Increased Development Alternative.

Traffic noise levels were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis prepared for this project (see Section 3.15, "Traffic and Transportation"). Modeling assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).

Source: Modeled by AECOM in 2010

Table 3.11-11 summarizes the CNEL/L_{dn} at 50 feet from the centerline of the near travel lane of area roadways for cumulative (future) conditions, with and without buildout of the project. Table 3.11-11 also shows the net difference in roadside noise levels for all the project alternatives analyzed. Modeled roadway noise levels assume no natural or artificial shielding between the roadway and the receptor. A noticeable increase of 3-dBA (CNEL/L_{dn}) (i.e., a significant impact) would typically occur with a doubling of roadway traffic volumes.

As shown in Table 3.11-11, traffic generated by cumulative (future) conditions under the No USACE Permit Alternative would result in traffic noise level increases ranging from 0.0 to 4.3 dBA. Traffic noise level increases under the Proposed Project Alternative in cumulative (future) conditions would range from 0.0 to 4.5 dBA. Traffic noise level increases from the Biological Impact Minimization Alternative under cumulative (future) conditions would range from 0.0 to 3.9 dBA. Traffic noise level increases from the Conceptual Strategy Alternative under cumulative (future) conditions would range from 0.0 to 4.1 dBA. Traffic noise level increases from the Increased Development Alternative under cumulative (future) conditions would range from 0.0 to 4.4 dBA. Therefore, implementation of the No USACE Permit, Proposed Project, Biological Impact Minimization, Agency Conceptual Strategy, and Increased Development Alternatives would result in a noticeable (i.e., 3 dBA) increase in ambient noise levels along Kiefer Boulevard between Zinfandel Drive and Sunrise Boulevard and between Sunrise Boulevard and Rancho Cordova Parkway under cumulative (future) conditions.

In addition, implementation of the Teichert, Stoneridge, and DeSilva Gates quarry projects would result in an increase in heavy-duty truck volumes on affected roadway segments and, consequently, an increase in traffic noise. Traffic noise levels associated with the related projects were predicted for affected roadway segments using FHWA's Highway Noise Prediction Model (FHWA-RD-77-108) (FHWA 1978) and traffic data (e.g., ADT volumes, vehicle speeds, percent distribution of vehicle types) from Fehr & Peers and Caltrans. This model is based on the CALVENO reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors and does not assume any natural or human-made shielding (e.g., the presence of vegetation, berms, walls, or buildings).

Table 3.11-12 summarizes the modeled traffic noise levels at the approximate road corridor boundary under cumulative (future) conditions with regard to the anticipated addition of quarry truck trips. As shown in Table 3.11-12, quarry truck activities would increase the traffic noise levels along Grant Line Road adjacent to the project site. As shown in Table 3.11-12, cumulative quarry truck noise levels, when added to the cumulative non-quarry traffic, would result in traffic noise increases of 2.2 to 3.2 dBA CNEL/L_{dn}. As stated above, a noticeable increase of 3 dBA (CNEL/L_{dn}) (i.e., a significant impact) would typically occur with a doubling of roadway traffic volumes.

Table 3.11-12
Summary of Modeled Cumulative (Future) Traffic Noise Levels
Along Grant Line Road Between Chrysanthy Boulevard and Kiefer Boulevard from Quarry Truck Trips

	Predicted Noise Level (dBA CNEL/L_{dn}) at 50 Feet from Near Travel Lane Centerline					
	NP	**NCP**	**PP**	**BIM**	**CS**	**ID**
With Quarry Trucks	77.5	77.7	78.1	77.8	77.8	77.8
Without Quarry Trucks	74.8	75.2	75.9	75.4	75.3	74.6
Change in dB	**2.7**	**2.5**	**2.2**	**2.4**	**2.5**	**3.2**

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels; dB = decibels; L_{dn} = day-night average noise level; NP = No Project Alternative; NCP = No USACE Permit Alternative; PP = Proposed Project Alternative; BIM = Biological Impact Minimization Alternative; CS = Conceptual Strategy Alternative; ID = Increased Development Alternative.
Traffic noise levels were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis prepared for this project (see Section 3.15, "Traffic and Transportation"). Modeling assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).
Source: Modeled by AECOM in 2011

Sensitive land uses (i.e., schools, parks, residences) that are proposed adjacent to Grant Line Road under the Increased Development Alternative would be exposed to a noticeable (i.e., 3-dBA) increase in ambient noise levels along Grant Line Road under cumulative combined quarry plus non-quarry traffic conditions.

Under the Proposed Project Alternative, a 60-acre Local Town Center would be constructed adjacent to Grant Line Road. According to the Draft SunCreek Specific Plan Section 1.3, "Land Use" (attached as Appendix C), land uses within the Local Town Center would consist of large retail stores, restaurant, lodging, and entertainment (including indoor and outdoor recreational facilities). Assuming that commercial buildings would be constructed that do not have windows on the side that faces Grant Line Road, the additional traffic generated by quarry truck trips would not result in an exceedance of City noise thresholds under the Proposed Project Alternative.

Because future growth is expected to surround the project site with a mix of traffic-generating development (including aggregate quarries) by 2030, resulting in greater area-wide and on-site noise levels, full buildout of development on the SPA itself would contribute to noticeable (i.e., 3 dBA or greater) increases in ambient traffic noise levels at noise-sensitive land uses that exceed land use compatibility noise criteria. Therefore, the project would result in a **cumulatively considerable** incremental contribution to a significant cumulative impact.

Mitigation Measure CUM Noise-1: Implement Measures to Reduce Exposure of Sensitive Receptors to Project-Generated Increases in Operational Traffic Noise Levels along Kiefer Boulevard (all Action Alternatives).

To meet applicable City noise standards and to reduce increases in traffic-generated noise levels at on-site noise-sensitive uses along Kiefer Boulevard, the project applicant (Shalako) of on-site residential areas adjacent to Kiefer Boulevard between Zinfandel Drive and Sunrise Boulevard and between Sunrise Boulevard and Rancho Cordova Parkway shall implement the following:

- Obtain the services of a consultant (such as a licensed engineer or licensed architect) to develop noise-attenuation measures for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms) that will produce a minimum composite Sound Transmission Class (STC) rating for buildings of 30 or greater, individually computed for the walls and the floor/ceiling construction of buildings, for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms) adjacent to Kiefer Boulevard.
- Prior to submittal of tentative subdivision maps and improvement plans, the Phase 1 project applicant (Shalako) shall demonstrate that project-generated operational traffic noise levels at on-site sensitive receptors along Kiefer Boulevard have been reduced such that City of Rancho Cordova noise standards are met by implementing one or more of the following:
  - construct exterior sound walls;
  - construct barrier walls and/or berms with vegetation;
  - use "quiet pavement" (e.g., rubberized asphalt) construction methods; or
  - use increased noise-attenuation measures in building construction (e.g., dual-pane, sound-rated windows; thicker exterior wall insulation).

Implementation: Project applicant of development Phase 1 (Shalako parcel).

Timing: During design review and before the approval of all subdivision maps and improvement plans, where applicable for project Phase 1.

Enforcement: City of Rancho Cordova Planning Department.

Mitigation Measure CUM Noise-2: Implement Measures to Reduce Exposure of Sensitive Receptors to Increased Traffic Noise Levels along Grant Line Road (applies to Increased Development Alternative Only)

The following measures shall be implemented under the Increased Development Alternative to reduce exposure of sensitive receptors to increases in traffic noise levels along Grant Line Road. Under the Proposed Project Alternative, this mitigation measure shall only apply if a land use other than a shopping center is constructed on the Local Town Center adjacent to Grant Line Road.

- A site-specific screening analysis shall be performed for all proposed sensitive receptors (e.g., residences, schools, daycares, libraries, etc.) that would be located along Grant Line Road between Chrysanthy Boulevard and Kiefer Boulevard using an approved three-dimensional traffic noise modeling program (i.e., TNM, SoundPlan). Each analysis shall be performed according to the standards set forth by the City of Rancho Cordova. The screening analysis shall account for the location of the receptors relative to the roadway, their distance from the roadway, and the projected future traffic volume for the year 2030. If the incremental increase in traffic noise levels are determined to exceed the threshold of significance recommended by the City of Rancho Cordova, then design mitigation shall be employed, such as the following:

  - Model the benefits of soundwalls (berm/wall combination) along Grant Line Road and the affected receptors not to exceed a total height of 10 feet (2-foot berm and 8-foot concrete masonry wall). If this mitigation measure is determined by the City of Rancho Cordova to be inadequate, additional three-dimensional traffic noise modeling shall be conducted with the inclusion of rubberized asphalt.

  - Implement the installation of rubberized asphalt (quiet pavement) on roadway segments adjacent to sensitive receptors if soundwalls do not provide adequate reduction of traffic noise levels. (The inclusion of rubberized asphalt would provide an additional 3 to 5 dB of traffic noise reduction.)

  - To improve the indoor noise levels at affected receptors on the SunCreek project site, implement the following measures before the occupancy of the affected residences and schools along Grant Line Road:

    – Conduct an interior noise analysis once detailed construction plans of residences adjacent to Grant Line Road to determine the required window package at second and third floor receptors to achieve the interior noise level standard of 45-dB L_{dn}.

    – Determine the interior traffic noise level increases at second and third floor receptors adjacent to Grant Line Road and install window package upgrades (increased sound transmission class rated windows) that would achieve the interior noise level standard of 45-dB L_{dn}.

Implementation: The project applicants of Phase 3 (Grantline 220 parcel).

Timing: During design review and before the approval of all subdivision maps and improvement plans, where applicable for project Phase 3.

Enforcement: City of Rancho Cordova Planning Department.

Implementation of Cumulative Mitigation Measure Noise-1 would reduce impacts from traffic noise on sensitive receptors levels along Kiefer Boulevard between (1) Zinfandel Drive and Sunrise Boulevard, and (2) between Sunrise Boulevard and Rancho Cordova Parkway, under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a level that is less-than-cumulatively considerable because buildings that will house sensitive land uses would be constructed with a minimum composite STC rating of 30 or greater, and one or more types of sound attentuation would be employed such as construction of exterior sound walls, barrier walls and/or berms, quiet pavement, etc.

Implementation of Cumulative Mitigation Measure Noise-2 would reduce the significant impact related to exposure of on-site sensitive receptors to noise from increased cumulative traffic levels along Grant Line Road under the Increased Development Alternative to a level that is less-than-cumulatively considerable because a site-specific noise assessment would be performed using an approved three-dimensional traffic noise modeling program, and in the event the 3-dBA increase in sound levels (or to increase interior sound levels above 45 dBA) occurs within 400 feet of any project-generated sensitive receptors, either the setback distances of the sensitive receptors from the road would be increased, the sound wall heights would be increased, or additional sound reduction measures such as quiet pavement would be constructed such that a 3-dBA increase would not occur.

(Note that no cumulative mitigation is required under the Proposed Project Alternative, because this analysis assumes that a shopping center [i.e., large retail stores] would be constructed along Grant Line Road according to the Draft SunCreek Specific Plan [Appendix C], and that such commercial buildings would be constructed without windows on the side that faces Grant Line Road.)