DOE/EIS–0458D

DRAFT ENVIRONMENTAL IMPACT STATEMENT

VOLUME I

DEPARTMENT OF ENERGY
LOAN GUARANTEE TO ROYAL BANK OF SCOTLAND FOR
CONSTRUCTION AND STARTUP OF THE TOPAZ SOLAR FARM
SAN LUIS OBISPO COUNTY, CALIFORNIA

US Department of Energy, Lead Agency
Loan Guarantee Program Office
Washington, DC 20585

In Cooperation with

US Army Corps of Engineers
San Francisco District

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COVER SHEET

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Title: Draft Environmental Impact Statement for the US Department of Energy Loan Guarantee to Royal Bank of Scotland for Construction and Startup of the Topaz Solar Farm, San Luis Obispo County, California

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Abstract: The US Department of Energy is proposing to issue a loan guarantee to Royal Bank of Scotland to provide funding to Topaz Solar Farms, Limited Liability Corporation (LLC) to construct and start up the Topaz Solar Farm, a nominal 550-megawatt photovoltaic solar energy generating facility. The facility would be located in unincorporated eastern San Luis Obispo County, California, approximately one mile north of the community of California Valley and six miles northwest of the Carrizo Plain National Monument. The proposed facility would consist of a solar field of ground-mounted PV modules, an electrical collection system that converts generated power from direct current to alternating current and delivers it to a Project substation for collection and conversion from 34.5 to 230 kV for delivery via a new on-site Pacific Gas and Electric (PG&E) switching station, and the PG&E switching station that interconnects the Project to PG&E's existing Morro Bay to Midway 230-kV transmission line. The facility would generate over one million megawatt-hours of electricity per year, enough to power 160,000 California homes annually. Generated electricity would be sold to PG&E under a long-term power purchase agreement.

Comments: Comments on this Draft EIS may be sent to Ms. Colamaria at the address above or may be emailed to *Topaz-EIS@hq.doe.gov.* All electronic and written comments should reference DOE/EIS–0458D. Comments must be postmarked no later than 45 days from the US Environmental Protection Agency's notice of availability of this Draft EIS in the *Federal Register*.

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Appendix A Public Scoping
Appendix B PG&E Connected Action
Appendix C Farmlands Correspondence and Analysis
Appendix D Visual Simulation Methodology
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ACRONYMS AND ABBREVIATIONS

	Full Phrase
AC	alternating current
ACEC	Area of Critical Environmental Concern
ADA	American with Disabilities Act
APCD	San Luis Obispo County Air Pollution Control District
APLIC	Avian Power Line Interaction Committee
APM	Applicant Proposed Measures
ARB	Air Resources Board
ARRA	American Recovery and Reinvestment Act of 2009
BA	biological assessment
bgs	below ground surface
BLM	United States Department of Interior, Bureau of Land Management
BMP	best management practice
BO	biological opinion
CAA	Clean Air Act
CAEDD	California Employment Development Department
CAISO	California Independent System Operator
Cal Fire	California Department of Forestry and Fire Protection
CalOSHA	California Division of Occupational Safety and Health
CalTrans	California Department of Transportation
CARB	California Air Resources Board
CA SDWA	California Safe Drinking Water Act
CBC	California Building Code
CDFG	California Department of Fish and Game
CDWR	California Department of Water Resources
CdS	cadmium sulfide
CdTe	cadmium telluride
CESA	California Endangered Species Act
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
County	San Luis Obispo County
CPUC	California Public Utilities Commission
CREZ	Competitive Renewable Energy Zone
CRHR	California Register of Historical Resources
CRP	Conservation Reserve Program
CUP	conditional use permit
CVSR	California Valley Solar Ranch
CWA	Clean Water Act

ACRONYMS AND ABBREVIATIONS

	Full Phrase
dB	decibel
dBA	decibel on an A-weighted scale, used to approximate the human ear's response to sound
DC	direct current
DHS	Department of Health Services
DOE	United States Department of Energy
DOGGR	California Department of Conservation, Division of Oil, Gas and Geothermal Resources
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EPA	United States Environmental Protection Agency
EPAct 2005	Energy Policy Act of 2005
ESA	Endangered Species Act
ESSW	Earth Systems Southwest
°F	degrees Fahrenheit
FCIR	Farmland Conversion Impact Rating
FEMA	Federal Emergency Management Agency
FIPP	Financial Institution Partnership Program
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act of 1981
General Permit	General Permit for Storm Water Discharges Associated with Construction Activity
GIS	geographic information systems
HCP	Habitat Conservation Plan
HMMP	Habitat Mitigation and Monitory Plan
HUC	Hydrological Unit Code
Inc.	Incorporated
KOP	key observation point
kV	kilovolt
L	Local Important
Leq	Equivalent Sound Level
LGIP	Large Generator Interconnection Procedure
LLC	Limited Liability Corporation
LOS	level of service
LP	Local Potential
M	Moment Magnitude
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
mg/L	milligrams per liter
MW	Megawatt

ACRONYMS AND ABBREVIATIONS

	Full Phrase
MW_{AC}	Megawatt alternating current
MWh	Megawatt hour
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NOC	Notice of Construction
NOI	Notice of Intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge and Elimination System
NRCS	United States Department of Agriculture Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHP	State Office of Historic Preservation
OSHA	Occupational Safety and Health Administration
PCS	Power Conversion Station
PG&E	Pacific Gas and Electric Company
PIDS	Perimeter Intrusion Detection System
PLP	Polarized Light Pollution
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PV	photovoltaic
PVC	polyvinyl chloride
PVCS	photovoltaic combining switchgear
RCRA	Resource Conservation and Recovery Act
RDM	residual dry matter
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SAIPE	Small Area Income Program Estimates
SCADA	supervisory control and data acquisition
SHPO	State Historic Preservation Office
SLO	San Luis Obispo
SLOCFD	San Luis Obispo County Fire Department
SLOCOG	San Luis Obispo Council of Governments
SO_x	sulfur oxides

ACRONYMS AND ABBREVIATIONS

	Full Phrase
SPCC	Spill Prevention Control and Countermeasure Plan
SDWA	Safe Drinking Water Act
SSC	Species of Special Concern
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TCA	traffic control area
TCWAA	Temporary Construction Worker Accommodations Area
TDS	total dissolved solids
$\mu g/m^3$	micrograms per cubic meter
UCMP	University of California Museum of Paleontology
US	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VRM	Visual Resource Management
Williamson Act	California Land Conservation Act

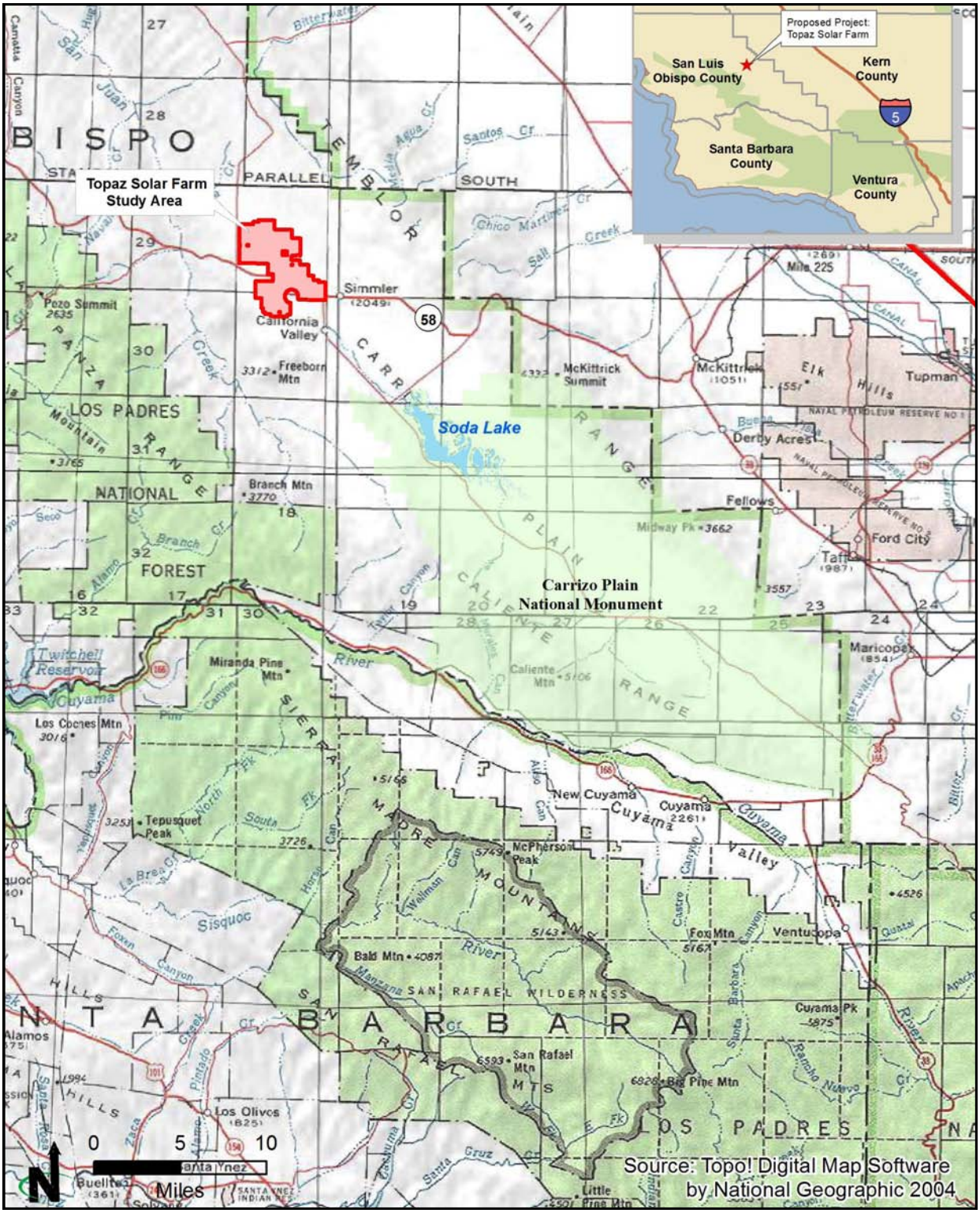
SUMMARY

INTRODUCTION

The United States (US) Department of Energy (DOE) is proposing to issue a loan guarantee to Royal Bank of Scotland to provide funding to Topaz Solar Farms, Limited Liability Corporation (LLC) (the Project Proponent) to construct and start up the Topaz Solar Farm (the Proposed Project), a nominal 550-megawatt (MW) photovoltaic (PV) solar energy generating facility. The Proposed Project would be located in eastern San Luis Obispo County, California (**Figure ES-1**, Regional Location Map). Upon completion, the facility would generate over one million megawatt hours (MWh) of electricity per year, enough to power 160,000 California homes annually.

DOE has determined that granting a federal loan guarantee to Royal Bank of Scotland to fund construction and startup of the Proposed Project constitutes a major federal action that may have a significant impact on the environment within the meaning of the National Environmental Policy Act (NEPA) (42 United States Code [USC] §§4321-4370h). DOE initiated preparation of this environmental impact statement (EIS) to examine the socioeconomic and environmental impacts from issuing the loan guarantee and from constructing, operating, and decommissioning the Proposed Project. The information contained in this EIS will be used by DOE in its decision-making process of whether to grant the federal loan guarantee for the Project.

The US Army Corps of Engineers (USACE), which has authority for issuing a Clean Water Act (CWA) Section 404 permit for the Proposed Project, is a cooperating agency for this EIS process. USACE will issue a separate decision document on the CWA Section 404 permit for the Proposed Project that will incorporate the environmental analyses from this EIS.



The proposed Topaz Solar Farm project is located on the Carrizo Plain, approximately one mile north of the community of California Valley and six miles northwest of the Carrizo Plain National Monument.

Regional Location Map

Topaz Solar Farm
San Luis Obispo County, CA

Figure S-1

PURPOSE AND NEED

Project Purpose and Need

The purpose of the Proposed Project is to increase the availability of electricity generated from renewable energy sources through the construction of a PV solar facility and associated transmission and support facilities. The need for increased renewable energy power generation stems from the following federal, state, and regional laws, regulations, goals, and policies:

- The Western Regional Climate Action initiative, a partnership among seven western states and four Canadian provinces, seeks to implement a cap and trade system with a goal of reducing emissions that cause global warming by 15 percent below 2005 levels by 2020.
- California Assembly Bill 32, signed into law in 2006, requires the California Air Resources Board (CARB) to develop regulations and market mechanisms to reduce California's greenhouse gas emissions to 1990 levels by 2020, an estimated 25-percent reduction.
- California Executive Order S-14-08, issued on November 11, 2008, established California Renewables Portfolio Standards requiring retail suppliers of electric services to increase procurement from eligible renewable energy resources to 33 percent by 2020. This order expanded the previous California Senate Bill 1078, passed in 2002, and Senate Bill 107, passed in 2006, which required retail suppliers of electric services to increase procurement of eligible renewable energy resources by 1 percent of their retail sales annually until they reached 20 percent by 2010.
- California Executive Order S-21-09, issued on September 15, 2009, directs CARB to adopt regulations increasing California's Renewables Portfolio Standard to 33 percent by 2020.

DOE Purpose and Need

The purpose and need of DOE's proposed action is to comply with its mandate to select eligible projects that meet the goals of the Energy Policy Act of 2005 (EPAct 2005), as amended by the American Recovery and Reinvestment Act (ARRA) of 2009. DOE is using the NEPA process and this EIS to assist in determining whether to issue a loan guarantee to the Project Proponent to support the Proposed Project.

EPAct 2005 established a federal loan guarantee program for eligible energy projects, and was amended by ARRA to create Section 1705, authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, among others. The primary purposes of ARRA are job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and state and local fiscal stabilization. The Section 1705 program is designed to address the current economic

conditions of the nation, in part, through renewable energy, transmission, and leading-edge biofuels projects.

Issuing a loan guarantee to Royal Bank of Scotland to finance the Proposed Project would avoid the production of greenhouse gas emissions associated with conventional methods of electrical generation. Assuming electricity generated from the Proposed Project displaced energy produced by natural gas-fired power plants, the Proposed Project would have annual greenhouse gas savings upon buildout of approximately 285,493 metric tons of carbon dioxide, or 8,564,790 metric tons over the life of the Project.

USACE Purpose and Need

The USACE must verify compliance with both the CWA and NEPA prior to issuing a permit for the Project. USACE has chosen to participate as a cooperating agency in the NEPA process conducted by DOE. USACE will use this EIS to provide a portion of its necessary NEPA environmental review for determining whether to issue a CWA Section 404 permit. USACE will issue a separate decision document on the CWA Section 404 permit for the Proposed Project that will incorporate the environmental analyses from this EIS.

USACE has determined that Waters of the US potentially would be filled by the Proposed Project and has directed that the Project Proponent apply for a Standard Individual Permit. The USACE purpose and need statement describes and presents the basic purpose and overall purpose of the Proposed Project as contemplated by Section 404. The basic project purpose is the fundamental or irreducible reason for the project that is used by USACE to determine if the proposed project is water dependent. The overall project purpose is a more detailed, comprehensive and project-specific version of the basic project purpose and it is used by USACE in determining if the proposed project is in compliance with the CWA.

The Proposed Project is expected to fill less than 0.1 acre of defined Waters of the US. The Proposed Project will not fill any wetlands or US Environmental Protection Agency (EPA) Special Aquatic Sites as defined by the CWA Section 404(b)(1) Guidelines. Compensatory mitigation is being provided by the Project Proponent for unavoidable impacts on waters that cannot be further minimized in the form of establishment (creation) of new waters within the impacted watershed.

DOE Proposed Action and Alternatives

Proposed Action

DOE's Proposed Action is to issue a federal loan guarantee to Royal Bank of Scotland to provide funding to the Project Proponent for the construction and startup of the Proposed Project, a nominal 550-MW solar energy generating facility within unincorporated eastern San Luis Obispo County, California,

approximately one mile north of the community of California Valley and six miles northwest of the Carrizo Plain National Monument.

The Proposed Project consists of a solar field of ground-mounted PV modules, an electrical collection system that converts generated power from direct current (DC) to alternating current (AC) and delivers it to a Project substation for collection and conversion from 34.5 kilovolts (kV) to 230 kV for delivery via a new on-site Pacific Gas and Electric Company (PG&E) switching station, and the PG&E switching station that interconnects the Proposed Project to PG&E's existing Morro Bay to Midway 230-kV transmission line, which runs in an east-west direction through the Project Site. PG&E upgrades to the Morro Bay to Midway transmission line are necessary to accommodate several projects in the region, including the final 150 MW of generated power by the Proposed Project (PG&E Reconductoring Project). The decision on the final facility configuration will be made by the County of San Luis Obispo through its conditional use permitting process; information on the final permitted configuration will be included in the Final EIS for the Proposed Project.

Key components of the Proposed Project include the following:

- Installation of approximately nine million PV solar modules and associated electrical equipment within up to 460 PV arrays;
- Electrical substation, switching station, and overhead collector lines;
- Monitoring and Maintenance Facility;
- Solar Energy Learning Center;
- Up to 22 miles of on-site access roads[1];
- Leach field and septic systems adjacent to the Monitoring and Maintenance facility and Solar Energy Learning Center; and
- Perimeter fencing around the PV arrays.

Generated electricity would be sold to PG&E under a long-term power purchase agreement in support of the requirement that PG&E provide its customers with 33 percent of its electricity from renewable sources by 2020, as mandated by Governor's Executive Order S-21-09.

[1] Because the location of access roads will be determined based on the San Luis Obispo County-permitted facility configuration, the miles of new roads that would need to be built versus the length of existing roads that would be improved is currently unknown.

The PG&E Reconductoring Project includes the following components:

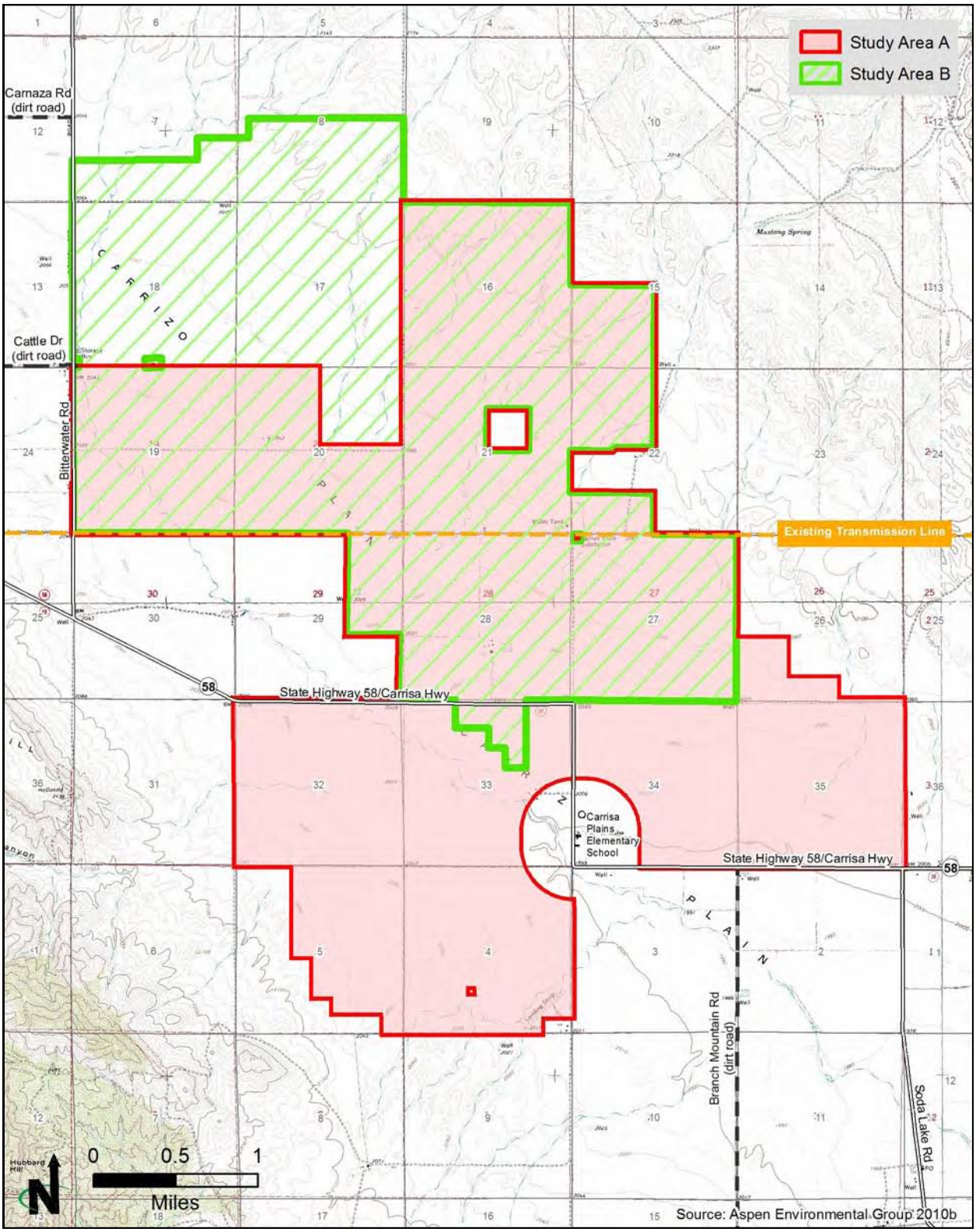
- Reconductoring approximately 35 miles of transmission line;
- Extending the height of every other tower by 20 feet to accommodate the new conductor;
- Potentially replacing up to ten percent of the towers to handle the additional weight;
- Installing an optical ground wire along the length of the reconductored line for static and fiber optic communications; and
- Installing a microwave tower and reflector.

Project-Specific Alternatives

Rather than being directly responsible for the siting, construction, and operation of respective projects selected in response to solicitations under EPAct 2005, DOE's actions under the act are limited to guaranteeing private financing secured by applicants for the project that they have submitted in their application. Therefore, DOE's overall decision will be to either provide a loan guarantee for the Proposed Project or to decline to provide a loan guarantee (no action alternative). However, the Project Proponent has secured options to purchase nearly 10,000 acres of land and is proposing to develop a facility on up to 4,100 acres of these lands. The Project Site has been divided into two overlapping study areas, Study Area A and Study Area B, on which the Proposed Project could be developed (**Figure S-1**, Study Area Map). The Project Proponent is proposing to develop the Proposed Project within one of these two study areas. These two project-specific alternatives are described below (and are hereafter referred to, interchangeably, as "alternatives" or "project-specific alternatives").

Alternative A: Develop the Proposed Project in Study Area A

Under Alternative A, the Proposed Project would be developed on up to 4,100 acres of a larger 7,800-acre study area termed Study Area A. Study Area A is approximately one mile north of the community of California Valley and six miles northwest of the Carrizo Plain National Monument. This study area encompasses the southern three-quarters of the 10,000 acres that have been secured by the Project Proponent. **Figure S-2,** Alternative A, details the location of the Project substation, switching station, monitoring and maintenance facility, and Solar Energy Learning Center, as well as potential areas in which PV arrays could be located within Study Area A. This proposed development area could be up to 4,100 acres in size, although the Project Proponent's current preferred layout is only approximately 3,400 acres.

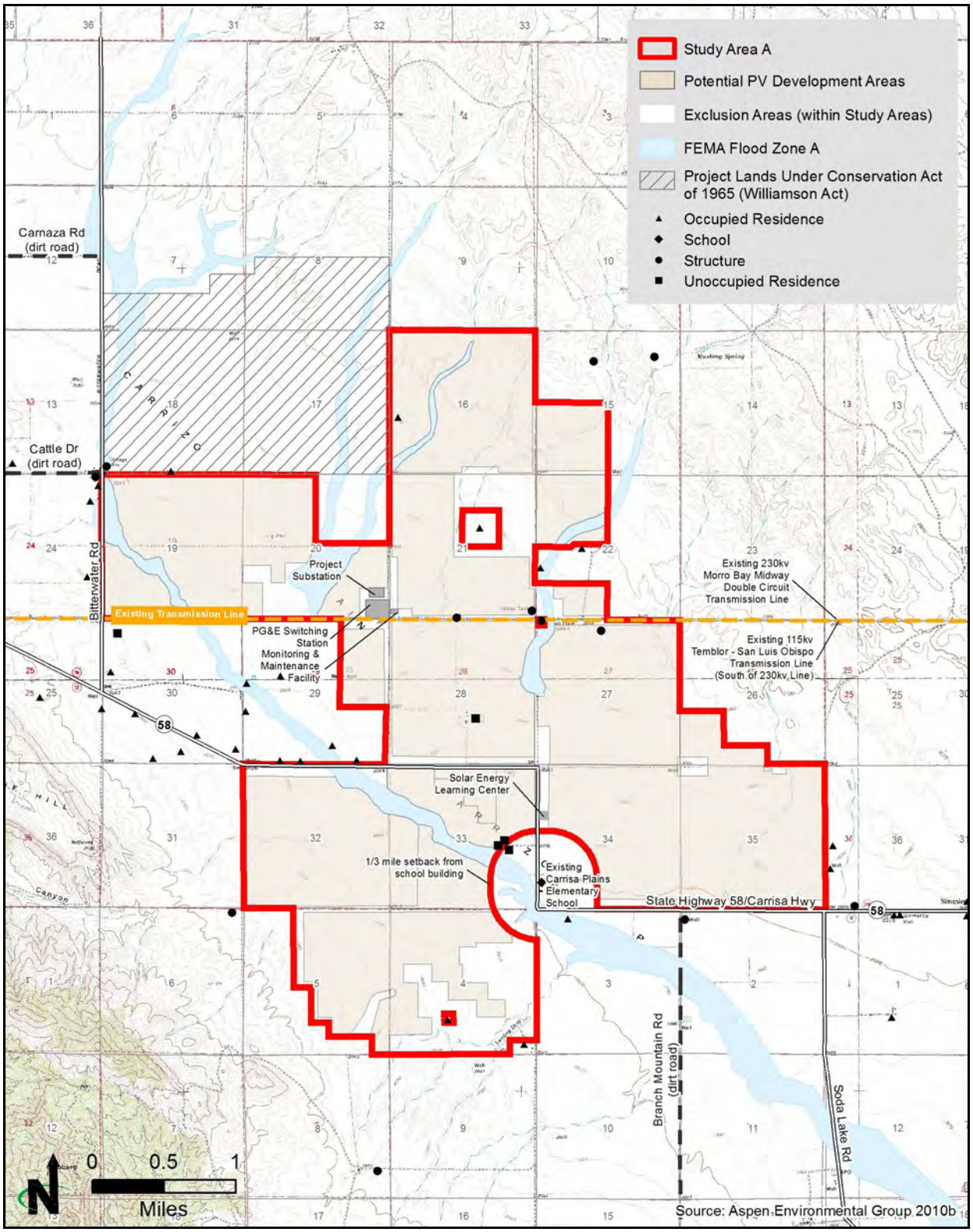


The Project Proponent is proposing to develop the Topaz Solar Farm in one of two study areas. The decision on the final facility configuration will be made by the County of San Luis Obispo through its conditional use permitting process.

Study Area Map

Topaz Solar Farm
San Luis Obispo County, CA

Figure S-2



Under Alternative A, the proposed Topaz Solar Farm would be developed on up to 4,100 acres. This alternative would avoid development of lands under Williamson Act contract.

Alternative A

Topaz Solar Farm
San Luis Obispo County, CA

Figure S-3

Alternative B: Develop the Proposed Project in Study Area B

Under Alternative B, Proposed Project would be developed on up to approximately 4,000 acres of a larger 6,300-acre study area termed Study Area B. Study Area B is approximately two miles north of the community of California Valley and seven miles northwest of the Carrizo Plain National Monument. This study area encompasses the northern two-thirds of the 10,000 acres that have been secured by the Project Proponent. **Figure S-3,** Alternative B, details the location of the Project substation, switching station, monitoring and maintenance facility, and Solar Energy Learning Center, as well as potential areas in which PV arrays could be located within Study Area B.

Comparison of Project-Specific Alternatives

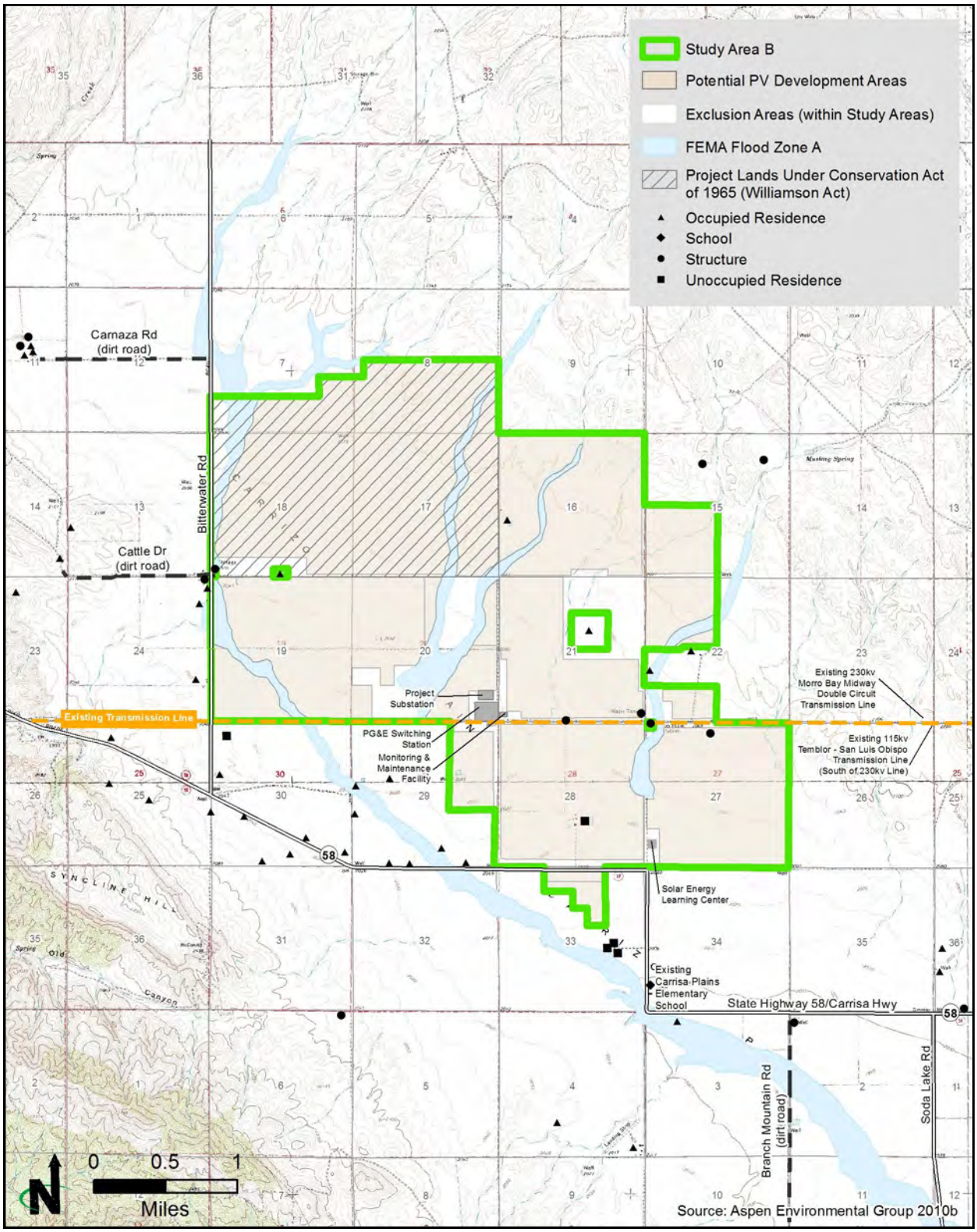
Both alternatives would consist of similarly sized solar generating equipment, a Project substation, a switching station, a monitoring and maintenance facility, a Solar Energy Learning Center, and infrastructure such as roads and fencing. The Project substation, switching station, and monitoring and maintenance facility would be sited in the same location under both alternatives. **Table S-1**, Comparison of Project-Specific Alternatives, provides a comparison of Alternative A and Alternative B. Other features would be the same under each alternative.

TABLE S-1
COMPARISON OF PROJECT-SPECIFIC ALTERNATIVES

PROJECT ELEMENT	ALTERNATIVE A	ALTERNATIVE B
Study Area (acres)	7,800	6,300
Developed Area (acres)	up to 4,100	up to 4,000
Overhead 34.5-kV Collector Lines (miles)	12	8
Access Roads (miles)	22	22

Project-Specific Alternatives Considered But Eliminated

Because DOE's decision in the context of the EPAct 2005 is strictly whether to provide or deny a federal loan guarantee for the Proposed Project, other alternatives available to DOE for agency action are not considered reasonable. The EIS nonetheless analyzes a range of reasonable project-specific alternatives to the Proposed Project itself. The project-specific alternatives that were considered but not carried forward for detailed analysis include alternative site locations, alternative project sizes, and alternative technologies. These project-specific alternatives did not meet the Project purpose and need, or are eliminated for other reasons provided in Section 2.1.3 of the EIS.



Under Alternative B, the proposed Topaz Solar Farm would be developed on up to approximately 4,000 acres of the 6,300-acre study area. This alternative would avoid most development south of Highway 58.

Alternative B

Topaz Solar Farm
San Luis Obispo County, CA

Figure S-4

No Action Alternative

Under the no action alternative, DOE would not provide a loan guarantee for the Proposed Project. In the absence of a DOE loan guarantee, the Project Proponent could still elect to construct and operate the proposed solar facility if it could obtain alternate sources of financing and the required permits from state and federal agencies; therefore, the DOE no action alternative could result in one of two potential scenarios:

- The Proposed Project would not be built; or
- The Proposed Project would be built by the Project Proponent without benefit of a loan guarantee.

Without DOE participation, it is possible that the Proposed Project would be canceled. For the purposes of analysis in this EIS, the DOE no action alternative will be a "No Build" alternative, meaning that environmental conditions would remain in the status quo and current land uses would continue. This scenario would not contribute to the federal loan guarantee program goal to make loan guarantees for energy projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases" or ARRA goals for rapid deployment of eligible renewable energy projects.

USACE Proposed Action and Alternatives

Proposed Action

Construction of the Proposed Project requires US Army Corps of Engineers permit pursuant to Section 404 of the CWA, along with appropriate NEPA analysis. As part of a separate CWA alternatives analysis in accordance with the Section 404(b)(1) Guidelines (40 Code of Federal Regulations [CFR] Part 230), USACE will incorporate into their NEPA analysis an evaluation of the potential impacts on the aquatic environment resulting from the construction and operation of the Proposed Project. This regulatory process requires selection of the least environmentally damaging practicable alternative, which would reduce the impacts on waters of the US, over which USACE has jurisdiction, as long as the alternative meets the Project Proponent's overall project purpose and so long as the alternative does not have other significant adverse environmental consequences.

The CWA "overall purpose" of the Proposed Project is to increase the availability of electricity generated from renewable energy sources through the development, in a high-solar resource area, of a 550-MW PV solar power plant and associated transmission and support facilities for interconnection to the Morro Bay to Midway 230-kV transmission line within eastern San Luis Obispo County, California.

No Action Alternative

Under the no action alternative, the Proposed Project would not be constructed.

PUBLIC INVOLVEMENT

Project scoping identifies issues of concern early in the EIS process. NEPA requires that the lead agency invite affected federal, state, and local agencies, any affected Native American tribes, and other interested persons to participate in the scoping process. The purpose of this scoping process is:

(1) to inform the public about a proposed action and the alternatives being considered; and

(2) to identify and clarify issues relevant to the EIS by soliciting public comments.

On October 22, 2010, DOE published a Notice of Intent (NOI) to prepare this EIS in the *Federal Register* (75 Fed. Reg. 65306), initiating a 30-day public scoping period. An announcement was published in the *San Luis Obispo Tribune* on October 29 and 31, 2010, the *Atascadero News* on October 29, 2010, and the *Paso Robles Press* on October 29, 2010, and mailed to federal, state, and local agencies, Native American tribes, special interest groups, and landowners soliciting information regarding environmental impacts that could potentially occur as a result of the Proposed Project. Copies of these materials are included in Appendix A of this EIS.

A public scoping meeting was held on November 16, 2010, at the Carrisa Plains Heritage Community Center. Approximately 30 persons attended the scoping meeting. Nine people entered comments into the public record during the public hearing portion of the meeting.

The scoping period ended on November 22, 2010. Seventeen written comment letters were received. Comment letters were submitted by the EPA, California Department of Forestry and Fire Protection (Cal Fire)/San Luis Obispo Fire Department, the County of San Luis Obispo, the Center for Biological Diversity, the Defenders of Wildlife/Sierra Club/Audubon California (submitted as one letter), and twelve individuals or their representatives that reside near the Project Site.

Some comments expressed support for the construction of the Topaz Project. Other comments expressed concern about the Project and identified the proposed Project Site as biologically valuable, for example, because of the presence of functional sensitive habitat and the potential to host a large number of rare biological resources. Comments expressed concern with regard to: site selection; impacts on sensitive biological resources, including sensitive habitat, protected species (e.g., the Federally protected San Joaquin Kit Fox), and wildlife movement; water quality and quantity in terms of the limited nature of water

resources and potential impacts to sensitive and locally-rare species; impacts on on-site drainage; full identification of sensitive habitats and species of the Carrizo Plain; impacts on nesting and foraging birds and bald and golden eagles; impacts from disposal of hazardous materials contained in PV panels; and the effects and causes of climate change. In addition, comments concerned the Proposed Project's consistency with local land use plans and existing land uses in the area, proximity to the Carrizo Plains National Monument, and seismic hazards.

The primary issues raised in the oral and written comments are presented in **Table S-2**, Summary of Scoping Issues.

TABLE S-2
SUMMARY OF SCOPING ISSUES

ISSUE	SUMMARY OF ISSUE	LOCATION WHERE ISSUE IS ADDRESSED IN THE EIS
Alternatives Analysis	Include a robust discussion of alternatives, including alternative sites, capacities, and technologies. Include alternatives to avoid or mitigate potential adverse impacts on biological resources. Identify an environmentally preferable alternative.	Section 2.1.2 provides information on the DOE alternative selection process. Section 2.1.3 describes project-specific alternatives and project-specific alternatives considered but eliminated.
	Evaluate alternative locations for the site, including in the Westlands Competitive Renewable Energy Zone; alternatives to utility-scale solar, including rooftop solar and smaller facilities located closer to users; and more efficient solar panels..	
	Evaluate providing funding to other types of projects.	
Biological Resources	Evaluate impacts on protected species and on wildlife connectivity.	Section 3.10 describes special status species in the project area and wildlife connectivity.
	Evaluate impacts related to the introduction of lighting, noise, loss and disruption of habitat on species in the area, including locally rare species.	Sections 3.8, 3.9, and 3.10 describe vegetation, wildlife, and special status species, respectively.
	Provide a full accounting of all flora and fauna on the Project Site, a thorough analysis of project and cumulative impacts, and a description of measures to avoid, minimize, and mitigate project impacts. Adopt protocol to perform seasonal surveys for sensitive plant and animals as part of site characterization and monitoring.	Sections 3.8, 3.9, and 3.10 describe vegetation, wildlife, and special status species, respectively. Measures proposed to minimize impacts are included in these sections and in Table 2-9. Cumulative effects are described in Section 3.18.
	Measures to prevent the spread of noxious weeds should be included.	Noxious weeds are discussed in Section 3.8.
	Impacts to the safety of the San Joaquin kit fox and fencing.	Measures proposed to minimize impacts are in Table 2-9 and the "Topaz Solar Farm San Joaquin Kit Fox Conservation and Monitoring Plan," included in Appendix E.

TABLE S-2 *(continued)*
SUMMARY OF PRIMARY SCOPING ISSUES

ISSUE	SUMMARY OF ISSUE	LOCATION WHERE ISSUE IS ADDRESSED IN THE EIS
Cadmium Telluride	Analyze the ability of cadmium telluride (CdTe) and cadmium sulfide (CdS) to enter environmental pathways through breakage or fire. Discuss the long-term reliability of encapsulation, emissions from broken modules in arid environments, the number of broken or cracked panels that could be stockpiled on site, and the ability to fight fires using water. Provide information on end-of-life treatment of panels.	Section 3.15 discusses potential effects of CdTe modules. Section 2.3.4 describes module decommissioning and recycling.
Water Resources	Estimate the quantity of water the Proposed Project will require, describe the source of this water, and evaluate the effects on other water users and natural resources in the project area. Analyze the impacts of the Proposed Project on downstream waters. Analyze impacts on jurisdictional waters and wetlands.	Section 3.7 discusses groundwater supply, surface waters, floodplains, wetlands, and Waters of the US.
Visual Resources	Describe project-specific and cumulative impacts on the visual character of the area and on nearby landowners from large-scale solar development. Evaluate glare and effects on the night sky.	Section 3.3 describes the potential visual impacts related to the Proposed Project.
Air Quality	Describe impacts on air quality and measures to reduce impacts.	Section 3.4 describes potential air quality impacts. Air quality measures are described in Section 3.4 and in Table 2-9.
Noise	Disclose noise impacts during construction and operation of the solar facility.	Section 3.5 discusses potential noise impacts.
Prime Farmlands	The Proposed Project would affect prime farmlands.	Section 3.1 discusses prime farmlands.
Environmental Justice	Evaluate Proposed Project impacts on minority populations and on schoolchildren at Carrisa Plains Elementary School.	Environmental justice issues are discussed in Section 3.14.
Cumulative Impacts	Evaluate the cumulative impact of large-scale solar projects on resources such as sensitive species and habitat, water supply, traffic, hazardous materials, and the visual environment.	Cumulative impacts are discussed in Section 3.18.

SUMMARY OF ENVIRONMENTAL IMPACTS

Table S-3, Summary of Environmental Impacts, provides a summary of the potential environmental effects that could result from implementing the Proposed Action and no action alternative. Potential effects of the Proposed Action relate primarily to construction, as operation of the facility would affect few resources.

The Project Proponent has proposed some measures and San Luis Obispo County (County) and other agencies may require additional measures to minimize the impact the Proposed Action would have on the human and natural environment. Because the Project Proponent will comply with these measures, they have been incorporated into the Proposed Action analyzed in this EIS. These measures would be implemented during construction and operation to reduce environmental impacts and to ensure consistency with applicable federal, state, and County rules and regulations.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
	LAND USE		
Minor to moderate adverse impacts. Alternative A contains no prime or unique farmlands or farmlands of statewide importance. Per Natural Resources Conservation Service (NRCS) analysis, 7,671 acres are farmlands of local importance, representing 2.8 percent of farmland in the county. Alternative A contains two occupied residences that could be partially or completely surrounded by PV arrays. The three-year construction process would disrupt land uses for these occupied residences, agricultural land uses within and near the Project Site, and the Carrisa Plains Elementary School. Construction of the Proposed Project may also periodically disturb visitors en-route to the Carrizo Plain National Monument. The presence of the Proposed Project would alter the rural and agricultural character of the immediate project area. Operation of the Proposed Project would result in the discontinuation of agriculture within the study area. It is possible, however, that some agriculture in the form of grazing may occur to control vegetation under the PV arrays.	Minor to moderate adverse impacts. Alternative B would have the same impacts as described for Alternative A except as noted below. • Per NRCS analysis, 6,193 acres are farmlands of local importance, representing 2.3 percent of farmland in the county. • The distance of Project facilities from Carrisa Plains Elementary School would increase by 800 feet, lessening potential adverse effects. • Visitors en route to the Carrizo Plains National Monument would be less affected because construction of PV arrays would occur farther away from main travel routes to the monument. • Alternative B includes lands under Williamson Act contract, which are contracts that preserve agricultural land uses in exchange for tax credits. Mitigation to compensate for loss of lands in the program would be required by the County if it elected to approve a conditional use permit (CUP) that included solar development on these lands.	Negligible to minor adverse impacts. Construction would temporarily conflict with agricultural and ranching operations. Reconductoring would not change existing land uses along the transmission line route.	No impacts. There would be no change in land uses on the Project Site.
	Visual Resources		
Moderate to substantial adverse impacts. The major visual impact during construction would be the placement and movement of construction equipment and materials and varying levels of dust creation during earth-disturbing actions. Staging and parking areas would represent a moderate level of visual change over existing conditions for the time in which they were in use. The Proposed Project would increase development in	Moderate to substantial adverse impacts. Alternative B would have the same impacts as described for Alternative A except as noted below. • PV array development would generally occur farther to the north and would thus be, for the most part, a greater distance away from public vantage points along Highway 58 and from Carrisa Plains Elementary School.	Minor to moderate adverse impacts. Construction within the foreground of sensitive receptors would have a short-term impact for the duration of the activity. Earth-disturbing activities could create fugitive dust	No impacts. The existing visual environment of the Project Site would remain the same.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
an agricultural area, introducing elements such as PV arrays, a substation, a switching station, a monitoring and maintenance building, a Solar Energy Learning Center, overhead collector line towers, and perimeter fencing. Primary public viewpoints would be from area roadways. The introduction of the Project would represent a moderate visual change from public viewpoints, although highly sensitive persons viewing the facility from nearby locations may experience a higher impact. In addition to public viewpoints, the Proposed Project would be visible from some area residences, particularly those residences that are fully or partially surrounded by Study Area A. While setbacks would provide a buffer zone between residents and the facility, the proposed facility may still have a substantial impact on nearby residences from the high degree of visual change.		clouds. Tower heights of every other tower would increase by 20 feet but would not introduce a new source of structure contrast, industrial character, view blockage, or skylining. Permanent elements would include new specular conductor line. The new conductor would reflect light and appear shiny to sensitive receptors in the vicinity of the line for the first 18 months after installation.	
	Air Quality		
Minor to moderate adverse impacts. Construction would have adverse air quality impacts from fugitive dust and equipment emissions. Emissions would be reduced by implementing dust control in accordance with San Luis Obispo County Air Pollution Control District (APCD) requirements and other measures to reduce emissions associated with construction equipment on the Project Site. Operation of the Proposed Project would result in no emissions of criteria air pollutants or greenhouse gases from operation of the solar generating equipment itself. Operation of the facility would result in minor emissions from personal and maintenance vehicles, limited delivery trucks, and limited equipment exhaust, as well as fugitive dust emissions from windborne dust and dust generated by vehicles on unpaved surfaces.	Minor to moderate adverse impacts. Air quality impacts would be similar to those described for Alternative A.	Negligible to minor adverse impacts. Minor fugitive dust emissions and emissions of criteria pollutant and greenhouse house emissions would occur from operation of vehicles and construction equipment. Operation of the reconductored line itself would generate no emissions. Minor emissions from vehicles used for routine maintenance and repair would occur.	No new impact. No change in air emissions would occur. Continued minor to moderate adverse fugitive dust impacts from farming operations. Potential beneficial impacts on global climate change described under the Proposed Action would not

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
Displacement of the current composition of PG&E-delivered electricity with Project-generated electricity would reduce greenhouse gas emissions by 288,475 metric tons annually, or 8,654,250 metric tons over the life of the Project. Operation of the Proposed Project would therefore represent a potential beneficial impact by reducing greenhouse gas emissions and helping to prevent or mitigate adverse effects of climate change. The Project would also help meet California's Renewable Portfolio Standard.			be realized.
Noise			
Minor to moderate adverse impacts. Construction of the Proposed Project would result in increases in noise levels that would be adverse when in close proximity to sensitive receptors. Sensitive receptors, including the two rural residences surrounded by the Project and the Carrisa Plains Elementary School, would experience temporary and intermittent noise levels greater than measured ambient levels. Construction would occur within permissible hours of operation as specified by code. Construction-related traffic would cause an increase in noise levels along affected roadways. Construction-related traffic noise levels would be less than the County's maximum allowable noise exposure limit for transportation noise sources. Noise from operation of the Proposed Project would be limited to vehicle use, the transformers and inverters, and heating, ventilation and air-conditioning systems and would have negligible impacts on sensitive noise receptors. Intermittent noise may occur during limited nighttime maintenance and if a breaker is thrown at the switching station.	Minor to moderate adverse impacts. Construction noise impacts would be similar to those described for Alternative A except as described below: • Carrisa Plains Elementary School would be 800 feet farther away from the Project boundary and would experience reduced noise levels compared with Alternative A. • Construction would be closer to one residence in Section 18.	Minor to moderate adverse impacts. Residences within one mile of the transmission line would experience temporary noise impacts during construction activities. Noise from corona activity and maintenance would be minor, similar to current conditions.	No impact. Noise conditions from actions at the Project Site would remain the same as currently experienced. Noise impacts along Highway 58 and other truck transportation and delivery routes would occur during construction of the California Valley Solar Ranch (CVSR), if the facility was permitted and constructed.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
Geology and Soils			
Minor to moderate adverse impacts. Construction would have the potential for increased erosion, and slope instability and landslides along moderate slopes of the La Panza Range foothills in the southwestern corner of the study area have the potential to impact Project facilities. Soil testing indicated that soils underlying Study Area A are moderately to severely corrosive to steel, are aggressive to copper, and are expansive, requiring design measures to prevent adverse impacts associated with construction in corrosive and expansive soils. Due to the absence of active faults at the Project Site, no potential for damage to Project structures or hazards to people at the Project Site from surface fault rupture is anticipated.	Minor to moderate adverse impacts. Impacts would be similar to those described for Alternative A except as noted below. • There would be no impact related to landslides or slope failures due to the topography of Study Area B.	Minor to moderate adverse impacts. Reconductoring would have potential short-term and localized erosion impacts during construction. Segments of the transmission line are within 200 feet of the Alquist-Priolo Earthquake Zone; potential exists for seismically induced slope failures or damage to transmission line structures.	No new impact. Current site conditions would remain the same. Continued minor to moderate adverse soil erosion impacts from land use practices such as ranching and farming.
Water Resources			
Minor to moderate adverse impacts. Study Area A contains 31 ephemeral drainages, totaling approximately 15 acres over 67,437 linear feet. Construction of road crossings and underground electrical collection system trenches would result in the permanent loss of less than 0.1 acre of jurisdictional ephemeral drainages. Jurisdictional wetland features totaling 3.11 acres have been documented in Study Area A, including vernal pools, ephemeral wetland depressions, and channel wetlands. Jurisdictional wetlands would be avoided and protected by buffers or setbacks ranging from 25 to 250 feet during construction. Road crossings and overhead and underground	Minor to moderate adverse impacts. Impacts would be similar to those described for Alternative A except as noted below. • Study Area B contains 12 ephemeral drainages occurring over approximately 31,742 linear feet; this alternative would result in the permanent loss of less than 0.1 acre of these drainages. • Jurisdictional wetland features totaling 0.71 acres have been documented in Study Area B, including vernal pools and ephemeral wetland depressions. Wetlands would be avoided and protected by buffer zones as described for Alternative A. • Road crossings and overhead and underground electrical collection lines would be installed in	Negligible to minor adverse impacts. The project could result in impacts on surface water, groundwater, and floodplains and includes the potential for water quality degradation. Negligible impacts on water resources from operation.	No new impact. Current site conditions would remain the same. Continued minor to moderate impacts on water quality caused by land use practices such as ranching and farming in wetlands and floodplains.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
electrical collection lines would be installed in FEMA-designated Zone A floodplains. Depending on the PV array configuration permitted by the County, some PV arrays could also be sited in the 100-year floodplain. The level of disturbance would not be expected to raise base flood elevations or affect up- or downstream flow levels. Alternative A would require an average of 170,500 gallons per day during construction, with a maximum demand of 550,000 gallons per day (primarily for dust control). Construction water obtained from groundwater wells on the Project Site would increase drawdown during summer months but would have only minor adverse effects on surrounding groundwater users. Operation would have minor to no adverse effects on water quality, wetlands, ephemeral drainages, groundwater supply, or groundwater recharge.	FEMA-designated Zone A floodplains under Alternative B; no arrays would be sited in floodplains. The level of development is not expected to raise base flood elevation or affect upstream or downstream flows. • A greater amount of water would be required for construction due to increased grading requirements under this alternative. Similar to Alternative A, this would have only minor adverse effects on surrounding groundwater users.		
Vegetation			
Minor adverse impacts. Study Area A contains 4,380 acres of cropland and 3,356 acres of annual grassland. Construction would result in the long-term removal of vegetation in areas associated with Project equipment and infrastructure. Temporary removal of vegetation would occur at parking and staging areas, trenching areas, and areas that would be graded to reduce slopes. Soil disturbance during construction could indirectly facilitate the invasion or spread of nonnative, invasive, or noxious weeds; however, weed prevention and control measures would be implemented to reduce the likelihood for the spread of invasion of weeds. Much of the current cropland acreage would be converted to annual grassland habitat. As a result, the	Minor adverse impacts. Impacts on vegetation from construction would be similar to those described for Alternative A except as noted below. • Study Area B contains 4,712 acres of cropland and 1,689 acres of annual grassland. More cropland could be converted to grassland under Alternative B compared with Alternative A, depending on the PV array configuration that was permitted by the County.	Minor adverse impacts. Direct impacts on vegetation could occur from construction activities in staging areas, pull sites, and temporary access roads. Indirect effects include potential for weed introduction or spread, soil compaction, erosion, and sedimentation. No permanent impacts on vegetation.	No new impact. Current site conditions would remain the same. Continued minor adverse impacts on vegetation from land use practices such as ranching and dry farming.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
Project Site may result in a net increase in annual grassland habitat through elimination of seasonal tilling. The Project could result in a beneficial effect on vernal pools and ephemeral wetland depressions through the elimination of tilling and the implementation of passive solar uses. No direct effects on vegetation are expected from operation of the Proposed Project. A vegetation management plan would be implemented during Project operation to control plant height and invasive species.			
Wildlife			
Minor to moderate adverse impacts. Construction activities could cause mortality or injury to a variety of wildlife species, especially slower-moving species, small animals, species that have subsurface burrows, or ground- or shrub-nesting birds. Bird mortality and/or injury could occur during operation of the Proposed Project due to collision or electrocution. Avian Power Line Interaction Committee (APLIC) guidelines and avian protection measures would be implemented to reduce the likelihood of bird collision and electrocution with collector lines. Habitat loss, fragmentation, and degradation caused by the Project could displace wildlife from the Project Site over the long term, preventing them from using the site for foraging, breeding, wintering, and shelter. Alternative A would permanently displace pronghorn antelope from up to 4,100 acres within the Project Site.	Minor to moderate adverse impacts. Impacts on wildlife would be similar to those described under Alternative A except as noted below. • Tule elk forage and calve in the northern parcels within Study Area B, an area of approximately 1,795 acres mostly comprised of active croplands. Alternative B would permanently displace approximately 80 elk from 1,215 acres of foraging habitat within the proposed fenced portion of Alternative B. • Alternative B would permanently displace pronghorn antelope from up to 4,000 acres.	Minor to moderate adverse impacts. The project would potentially impact bird nests and create disturbance to tule elk and pronghorn antelope calving grounds. PG&E would implement mitigation measures similar to those in its San Joaquin Valley Operations and Maintenance Multi-Species Habitat Conservation Plan (HCP) to reduce temporary impacts. No operational impacts would occur from reconductoring.	No new impact. Current site conditions would remain the same. Continued minor adverse impacts on wildlife from land use practices such as ranching and farming.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
	Special Status Species		
Minor to moderate adverse impacts. Surveys of the Project Site detected the presence in Study Area A of three federally protected species: two species of fairy shrimp and the San Joaquin kit fox. The Project would avoid all occurrences of the federally listed species of fairy shrimp. Potential direct and indirect construction impacts on San Joaquin kit fox would be mitigated through implementation of measures developed through consultation with the County, United States Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG). Potential long-term effects include a change in the habitat structure in the area, which could result in a decrease, increase, or maintenance of San Joaquin kit fox numbers. Operational impacts would be minimized through implementation of additional mitigation measures developed in consultation with the above-listed agencies. Surveys detected the presence of nine special status plant species. Construction activities would likely result in short-term adverse effects on special status plants occurring within the fenced area if the activities overlap the bloom periods, if perennial species are removed, or if substantial soil disturbance occurs. The Proposed Action could have a long-term beneficial effect on special status plants through the permanent conversion of an estimated 2,360 acres of cropland habitat to annual grassland habitat. Construction activities could potentially have direct impacts on other special status animal species. In the long term, cessation of farming activity and conversion of croplands to a passive solar facility could improve habitat quality, resulting in a potential beneficial effect on these species.	Minor to moderate adverse impacts. Impacts would be similar to those described under Alternative A except as noted below. • Surveys of the Project Site detected the presence in Study Area B of two federally protected species: one species of fairy shrimp and the San Joaquin kit fox. • Alternative B would impact fewer special status plant species, since only four species were detected within Study Area B. • Alternative B would permanently convert an estimated 2,852 acres of cropland habitat within the fenced area to annual grassland habitat that would be potentially suitable for special status plant establishment.	Minor to moderate adverse impacts. Construction could result in disturbance to or loss of numerous special status species or their habitat, including blunt-nosed leopard lizard, San Joaquin whipsnake, coast horned lizard, burrowing owl, Swainson's hawk, white-tailed kite, Nelson's antelope squirrel, San Joaquin kit fox, giant kangaroo rat, Tipton kangaroo rat, Tulare grasshopper mouse, and American badger. The project could potentially impact special status species bird nests. PG&E would implement measures to reduce the impacts on biological resources. In addition, mitigation would include compensation for impacts on giant kangaroo rat, San Joaquin kit fox, and Nelson's antelope squirrel. No impacts on special status species would occur from operation of the reconductored line.	No new impact on special status species. Land uses would remain the same. Continued impacts on special status species from land use practices such as ranching and farming.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
Cultural Resources			
Minor to moderate adverse impacts. No potentially eligible resources were identified within Study Area A, subject to SHPO concurrence. There is the potential for undiscovered buried cultural resources and/or human remains to exist at the Project Site. In the event of an unanticipated discovery, measures would be followed to reduce the likelihood for impact. These measures could include ceasing work and having a qualified archeologist evaluate the resource for eligibility to the state or national registers, or contacting the County Coroner if human remains are encountered. Operation of the Proposed Project would have minor to moderate indirect impacts on the historic landscape setting of cultural resources by altering the landscape. Project operations would not be expected to encounter previously undiscovered resources due to the lack of surface-disturbing actions. However, if such discoveries are made, procedures such as those described for construction should be followed.	Minor to moderate adverse impacts. Impacts would be similar to those described under Alternative A except as noted below. • No potentially eligible resources were identified within Study Area B, subject to SHPO concurrence.	Minor adverse impacts. No eligible cultural resources sites would be affected by construction. The potential exists for undiscovered buried cultural resources and/or human remains along the transmission line, though the potential would be low based on previous disturbance along the route. Impacts on cultural resources would not be expected to occur during operation of the reconductored line.	No impact. Existing site conditions would remain the same.
Paleontology Resources			
Minor to moderate adverse impacts. Although no vertebrate fossils have been recorded within the Project Site, several fossil-bearing geologic formations with high sensitivity are located in Study Area A. Therefore, there is a moderate potential for construction activities to directly impact paleontological resources. To minimize potential impacts, a Paleontological Monitoring and Treatment Plan would be prepared to outline the criteria for determining paleontological resource significance and guidelines for whether a resource should be avoided	Minor to moderate adverse impacts. Impacts would be similar to those described under Alternative A except as noted below. • More grading could occur under Alternative B; therefore, the increase in ground disturbance would result in a slightly increased potential for encountering and disturbing paleontological resources under this alternative.	Minor to moderate adverse impacts. Construction in areas with low sensitivity is not expected to encounter paleontological resources. Construction in areas with a higher sensitivity may encounter such resources. Application of a Paleontological Monitoring	No impact. Existing site conditions would remain the same.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
or recovered.		and Treatment Plan, as determined necessary by the County, would reduce impacts on paleontological resources during construction. No paleontological impacts would occur during operation.	
Socioeconomics			
Minor to moderate impacts. Alternative A would create 500 peak construction jobs, temporarily reducing unemployment in the region and contributing beneficially to the local economy. Solar construction projects in the region may result in periods when temporary housing demand exceeds supply, a minor to moderate adverse impact. Operation of the Proposed Project would not displace any jobs, as Project lands are currently farmed by the property owners. Operation would have negligible beneficial impact as a result of reduction in local unemployment. Local governments could benefit economically from tax revenues due to Project operation.	Minor to moderate impacts. Potential impacts would be the same as those described for Alternative A.	Negligible impact. Most of the work would be carried out by PG&E employees with a maximum estimated construction workforce of 50 individuals and would not affect employment levels or the local economy. No impact from operation, as no additional workforce would be required.	No impact. Socioeconomic conditions would remain the same. Beneficial impacts on employment and the local economy associated with project construction would not be realized.
Environmental Justice and Protection of Children			
Negligible to minor adverse impact. A minority or low-income population as characterized by the Council on Environmental Quality (CEQ) does not exist in the immediate project area. Therefore, significant adverse impacts on these populations are not anticipated from construction and operation of the Proposed Project.	Negligible to minor adverse impact. Impacts would be similar to those described under Alternative A except as noted below. • Alternative B would have a slightly lesser potential for adverse effect on children, as the Project would be developed at a greater distance from Carrisa Plains Elementary School when	Negligible to minor adverse impact. No minority communities have been identified in the San Luis Obispo County portion of the project area. Minority populations do exist	No impact. Conditions for low-income and minority populations in Kern County would remain the same.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
The Carrisa Plains Elementary School is within close proximity of the Project Site. Measures including setbacks and fencing are being proposed to reduce the risk to children. Operation would not place children at risk, as Project facilities would be fenced and no public access would be permitted. In addition, operations would not introduce air pollutants or hazardous materials into the environmental pathways.	compared with Alternative A.	along or near the transmission line route in Kern County. Impacts to these populations would be minimized through measures to reduce air and noise impacts during construction. Negligible impact on children, as construction sites and material storage areas would be secured. Operation would have no environmental justice-related effects over existing conditions.	Conditions for children at the Project Site would remain the same.
	Public Health and Safety/ Hazardous Materials		
Minor to moderate adverse impact. Construction of the facility would follow federal, state, and local laws and regulations governing handling and storage of hazardous materials. Vehicle fuel and transformer oil stored on site would have full secondary containment. All construction activities would be performed by trained personnel and would be carried out in compliance with Occupational Safety and Health Act (OSHA) requirements to minimize the risk of construction-related accidents, injuries or spills. Operation of the facility would present little public health or safety risk from intentional destructive acts. The fire risk for a PV solar project is very low due to the limited use of combustible materials in the Project components. No public access to the facility would be allowed, the entire Project Site would be fenced and monitored with security cameras, and the site perimeter would be patrolled twice per day. With	Minor to moderate adverse impact. Public health and safety impacts would be the same as described for Alternative A.	Minor adverse impacts. Only small amounts of hazardous materials and herbicides would be used during construction. Reconductoring activities would take place in areas of low or moderate fire hazard severity and would not pose a substantial fire risk. Possible health effects associated with exposure to EMFs have been the subject of scientific investigation since the 1970s. Reviews of the scientific literature have consistently indicated insufficient evidence of an	No impact. There would be no change to existing public health and safety conditions.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
these security measures in place, the risk of intentional destruction would be negligible. No adverse health effects are anticipated related to electric and magnetic fields (EMF) or use of CdTe panels.		association between EMF exposure and adverse health effects in humans.	
	Transportation		
Moderate adverse impact. The Proposed Project would affect the local transportation network during the construction period. Construction-related traffic would not result in a decrease in level of service (LOS) on area roadways; however, individual drivers would experience substantial delays along a section of Highway 58 east of the Project Site, when the road would be closed in one direction and trucks exceeding a certain size would be escorted through a nine-mile section of roadway. Fifteen full-time workers would be employed during operation of the Proposed Project. The addition of 15 round trips would not cause a decrease in LOS on any area roadways.	Moderate adverse impact. Transportation-related impacts from construction, operation, and decommissioning would be the same as described for Alternative A.	Minor adverse impacts. Construction traffic would not alter LOS on area roadways. Construction would briefly close Highway 33 while crews reconductor the overhead line across the highway. Helicopter operations, used to access remote portions of the line, may also require temporary road closures. These actions would have a temporary, impact on transportation. No impacts during operation.	No impact. Traffic conditions associated with current land uses would remain the same. Temporary adverse transportation impacts along Highway 58 would occur if the CVSR project is constructed.
	Infrastructure		
Minor to moderate adverse impact. Construction activities would increase the risk of fire, placing an increased demand on limited fire protection and safety services during construction. County development impact fees paid by the Project Proponent would allow the nearest fire station to attain adequate staffing necessary to respond to emergencies at the Project Site. To ensure adequate emergency vehicle access throughout the construction period, Cal Fire and the Sheriff's Department would	Minor to moderate adverse impact. Infrastructure impacts would be the same as described for Alternative A.	No impact. Reconductoring would be accomplished by up to 50 PG&E employees. Construction would not impact school enrollment, increase the demand for police or fire services, or interrupt electrical service	No impact. Existing infrastructure conditions or public service requirements would remain the same.

TABLE S-3
SUMMARY OF ENVIRONMENTAL IMPACTS

ALTERNATIVE A	ALTERNATIVE B	RECONDUCTORING	NO ACTION ALTERNATIVE
review construction plans to ensure adequacy of access for emergency service providers. The Project Site is in a high severity risk area for wildland fire. However, existing grassland vegetation is considered a low-fuel load type of vegetation and is one of the easier vegetation and habitat types to manage or control when fire conditions exist. A Wildfire Management Plan has been prepared for the Project to manage fire conditions. Operation of the Project could result in a minor increase in enrollment levels at local schools. The Project Proponent would pay development fees, which, together with increased school revenue from property tax increases, would provide a minor beneficial impact on local schools.		along the line. Operation would not increase demands on any current services or utilities.	

CHAPTER 1
PURPOSE AND NEED

1.1 INTRODUCTION

The United States (US) Department of Energy (DOE) is proposing to issue a loan guarantee to Royal Bank of Scotland (the Applicant) to provide funding to Topaz Solar Farms, Limited Liability Corporation (LLC) (the Project Proponent), a wholly-owned subsidiary of First Solar, Incorporated (Inc.), to construct and start up the Topaz Solar Farm (the Proposed Project), a nominal 550-megawatt (MW) photovoltaic (PV) solar energy generating facility. The Proposed Project would be located in eastern San Luis Obispo County, California. Upon completion, the facility would generate over one million megawatt hours (MWh) of electricity per year, enough to power 160,000 California homes annually.

DOE has determined that granting a federal loan guarantee to Royal Bank of Scotland to fund construction and startup of the Proposed Project constitutes a major federal action that may have a significant impact on the environment within the meaning of the National Environmental Policy Act (NEPA) (42 United States Code [USC] §§4321-4370h). DOE initiated preparation of this environmental impact statement (EIS) to examine the socioeconomic and environmental impacts from issuing the loan guarantee and from constructing, operating, and decommissioning the Proposed Project. The information contained in this EIS will be used by DOE in its decision-making process of whether to grant the federal loan guarantee for the Project. The EIS has been prepared in accordance with NEPA, Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500−1508), and DOE NEPA Implementing Procedures (10 CFR Part 1021).

The US Army Corps of Engineers (USACE), which has authority for issuing a Clean Water Act (CWA) Section 404 permit for the Proposed Project, is a cooperating agency for this EIS process. USACE will issue a separate decision document on the CWA Section 404 permit for the Proposed Project that will incorporate the environmental analyses from this EIS.

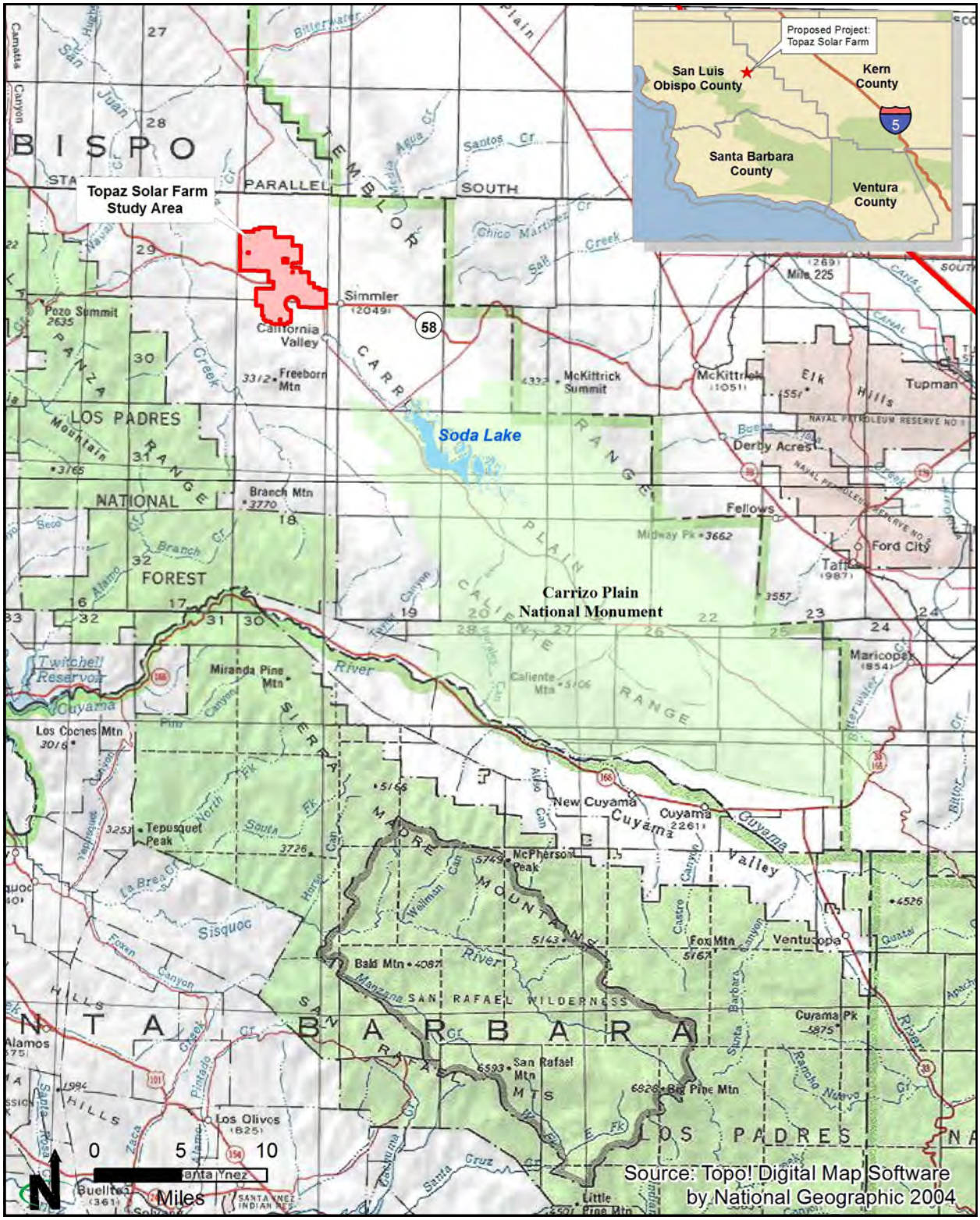
1.2 PROJECT LOCATION AND OVERVIEW

The Project Site is within unincorporated eastern San Luis Obispo County, California, approximately one mile north of the community of California Valley and six miles northwest of the Carrizo Plain National Monument. Santa Margarita and Highway 101 are approximately 40 miles to the west, and Interstate 5 is approximately 50 miles to the east. Access to the Project Site is from California State Highway 58 to the north and south and Bitterwater Road to the west (**Figure 1-1**, Regional Location Map). The Project Site consists of privately owned disturbed lands characterized by actively farmed and fallow level terrain and by low, rolling hills with meandering ephemeral swales.

The Proposed Project is a 550-MW utility-scale PV generating facility consisting of a solar field of ground-mounted PV modules, an electrical collection system that converts generated power from direct current (DC) to alternating current (AC) and delivers it to a Project substation for collection and conversion from 34.5 kilovolts (kV) to 230 kV for delivery via a new on-site Pacific Gas and Electric Company (PG&E) switching station, and the PG&E switching station that interconnects the Proposed Project to PG&E's existing Morro Bay to Midway 230-kV transmission line, which runs in an east-west direction through the Project Site. PG&E upgrades to the Morro Bay to Midway transmission line are necessary to accommodate several projects in the region, including the final 150 MW of generated power by the Proposed Project (PG&E Reconductoring Project), and they are therefore evaluated herein as a connected action to the Proposed Project. The decision on the final facility configuration will be made by the County of San Luis Obispo through its conditional use permitting process; information on the final permitted configuration will be included in the Final EIS for the Proposed Project. Key components of the Proposed Project, which are described in detail in Section 2.3.1 and depicted where known on Figures 2-2 and 2-3, include the following:

- Installation of approximately nine million PV solar modules and associated electrical equipment within up to 460 PV arrays;
- Electrical substation, switching station, and overhead collector lines;
- Monitoring and Maintenance Facility;
- Solar Energy Learning Center;
- Up to 22 miles of on-site access roads[1];
- Leach field and septic systems adjacent to the Monitoring and Maintenance facility and Solar Energy Learning Center; and

[1] Because the location of access roads will be determined based on the San Luis Obispo County-permitted facility configuration, the miles of new roads that would need to be built versus the length of existing roads that would be improved is currently unknown.



The proposed Topaz Solar Farm project is located on the Carrizo Plain, approximately one mile north of the community of California Valley and six miles northwest of the Carrizo Plain National Monument.

Regional Location Map

Topaz Solar Farm
San Luis Obispo County, CA

Figure 1-1

- Perimeter fencing around the PV arrays.

Generated electricity would be sold to PG&E under a long-term power purchase agreement in support of the requirement that PG&E provide its customers with 33 percent of its electricity from renewable sources by 2020, as mandated by Governor's Executive Order S-21-09.

The PG&E Reconductoring Project, described in more detail in Section 2.4, Connected Action, and in Appendix B, PG&E Connected Action, includes the following components:

- Reconductoring approximately 35 miles of transmission line;
- Extending the height of every other tower by 20 feet to accommodate the new conductor;
- Potentially replacing up to ten percent of the towers to handle the additional weight;
- Installing an optical ground wire along the length of the reconductored line for static and fiber optic communications; and
- Installing a microwave tower and reflector.

1.3 PURPOSE OF AND NEED FOR ACTION

1.3.1 Project Purpose and Need

The purpose of the Proposed Project is to increase the availability of electricity generated from renewable energy sources through the construction of a PV solar facility and associated transmission and support facilities. The need for increased renewable energy power generation stems from the following federal, state, and regional laws, regulations, goals, and policies:

- The Western Regional Climate Action initiative, a partnership among seven western states and four Canadian provinces, seeks to implement a cap and trade system with a goal of reducing emissions that cause global warming by 15 percent below 2005 levels by 2020.
- California Assembly Bill 32, signed into law in 2006, requires the California Air Resources Board (CARB) to develop regulations and market mechanisms to reduce California's greenhouse gas emissions to 1990 levels by 2020, an estimated 25-percent reduction.
- California Executive Order S-14-08, issued on November 11, 2008, established California Renewables Portfolio Standards requiring retail suppliers of electric services to increase procurement from eligible renewable energy resources to 33 percent by 2020. This order expanded the previous California Senate Bill 1078, passed in 2002, and Senate Bill 107, passed in 2006, which required retail suppliers of electric services to increase procurement of eligible

renewable energy resources by 1 percent of their retail sales annually until they reached 20 percent by 2010.

- California Executive Order S-21-09, issued on September 15, 2009, directs the California Air Resources Board to adopt regulations increasing California's Renewables Portfolio Standard to 33 percent by 2020.

1.3.2 DOE Purpose and Need

The purpose and need of DOE's Proposed Action is to comply with its mandate to select eligible projects that meet the goals of the Energy Policy Act of 2005 (EPAct 2005), as amended by the American Recovery and Reinvestment Act (ARRA) of 2009. DOE is using the NEPA process and this EIS to assist in determining whether to issue a loan guarantee to the Project Proponent to support the Proposed Project.

As described further in Section 1.4.1, EPAct 2005 established a federal loan guarantee program for eligible energy projects, and was amended by ARRA to create Section 1705, authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, among others. The primary purposes of ARRA are job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and state and local fiscal stabilization. The Section 1705 program is designed to address the current economic conditions of the nation, in part, through renewable energy, transmission, and leading-edge biofuels projects.

Issuing a loan guarantee to Royal Bank of Scotland to finance the Proposed Project would avoid the production of greenhouse gas emissions associated with conventional methods of electrical generation. Assuming electricity generated from the Proposed Project displaced energy produced by natural gas-fired power plants, the Proposed Project would have annual greenhouse gas savings upon buildout of approximately 285,493 metric tons of carbon dioxide, or 8,564,790 metric tons over the life of the Project.

1.3.3 USACE Purpose and Need

The USACE must verify compliance with both the CWA and NEPA prior to issuing a permit for the Project. USACE has chosen to participate as a cooperating agency in the NEPA process conducted by DOE. USACE will issue a separate decision document on the CWA Section 404 permit for the Proposed Project that will incorporate the environmental analyses from this EIS.

USACE has determined that Waters of the US potentially would be filled by the Proposed Project and has directed that the Project Proponent apply for a Standard Individual Permit. This USACE purpose and need statement describes and presents the basic purpose and overall purpose of the Proposed Project as contemplated by Section 404.

USACE takes into account information supplied by the applicant to define the basic and overall project purposes during its CWA Section 404 review process. The basic project purpose is the fundamental or irreducible reason for the project that is used by USACE to determine if the proposed project is water dependent. The overall project purpose is a more detailed, comprehensive and project-specific version of the basic project purpose and it is used by USACE it considers alternatives in determining if the proposed project is in compliance with the CWA.

The CWA Section 404(b)(1) Guidelines provide substantive criteria that USACE uses to determine whether a proposed site is suitable for discharge of dredged or fill material and whether a proposed discharge of dredged or fill material (activity) is eligible for authorization under Section 404 of the CWA. Central to the guidelines is a hierarchical approach designed to minimize impacts on wetlands and other Waters of the United States. Specifically, applicants are required to: (1) avoid impacts where possible; (2) minimize unavoidable impacts; and (3) compensate for any remaining impacts that can neither be avoided nor minimized such that overall project impacts on the aquatic environment are minimal on both an individual and cumulative basis.

Per the CWA Section 404(b)(1) Guidelines requirements, the Project Proponent has provided in the permit application to the USACE both a stated basic and overall project purpose:

- The CWA basic purpose of the Proposed Project is to increase the availability of electricity generated from renewable energy sources, through the construction of a PV solar facility and associated transmission and support facilities that interconnect with the Morro Bay to Midway 230-kV transmission line.
- The CWA overall purpose of the Proposed Project is to increase the availability of electricity generated from renewable energy sources through the development, in a high-solar resource area, of a 550-MW PV solar facility and associated transmission and support facilities for interconnection to the Morro Bay to Midway 230-kV transmission line within eastern San Luis Obispo County, California.

The Proposed Project is expected to fill less than 0.1 acre of defined Waters of the US. The Proposed Project will not fill any wetlands or US Environmental Protection Agency (EPA) Special Aquatic Sites as defined by the CWA Section 404(b)(1) Guidelines. Compensatory mitigation is being provided by the Project Proponent for unavoidable impacts on waters that cannot be further minimized in the form of establishment (creation) of new waters within the impacted watershed.

As indicated in Section 1.3.1, Project Purpose and Need, there is a public need for the Proposed Project because it would help meet California's growing energy demands and reduce carbon emissions in response to both legislative and executive mandates. It would contribute to helping California meet its targets for renewable energy generation; under the California renewable portfolio standard, renewable energy is to account for 20 percent of the state's energy demand by 2010 and 33 percent by 2020. In addition, the Proposed Project would contribute to economic development in San Luis Obispo County (County).

1.4 BACKGROUND

1.4.1 DOE Loan Guarantee Program Overview

EPAct 2005, as amended by Section 406 of the ARRA, established a federal loan guarantee program for eligible energy projects that employ innovative technologies. Section 1703 of Title XVII of the act authorizes the Secretary of Energy to make loan guarantees for a variety of project types, including those that:

(1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and

(2) employ new or significantly improved technologies as compared to commercial technologies in service in the US at the time the guarantee is issued (42 USC 16513).

Title XVII identifies ten categories of technologies and projects potentially eligible for loan guarantees, including those for renewable energy technologies. The two principal goals of the loan guarantee program are:

(1) to encourage commercial use in the US of new or significantly improved energy-related technologies; and

(2) to achieve substantial environmental benefits.

Under ARRA, Congress established a temporary program under Section 1705 of Title XVII of EPAct 2005 authorizing DOE to make loan guarantees to encourage rapid deployment of certain renewable energy systems, electric transmission systems, and leading-edge biofuels projects. These projects do not need to employ innovative technologies but do need to commence construction no later than September 30, 2011.

On October 7, 2009, DOE issued a federal loan guarantee program solicitation entitled, "Federal Loan Guarantees for Commercial Technology Renewable Energy Generation Projects under the Financial Institution Partnership Program (FIPP)" (Solicitation No. DE–FOA–0000166). In the FIPP program, DOE implements the application process by working directly with certain qualified financial institutions through a set of procedures established by DOE. The FIPP

program is intended to expedite the loan guarantee process and expand senior credit capacity for the efficient and prudent financing of eligible projects under Section 1705 of Title XVII that use commercial technologies. Under the FIPP program, project sponsors may not apply directly to DOE but must instead work with a financial institution that meets DOE qualification as a lead lender. For this project, the Royal Bank of Scotland is acting as the lead lender.

The October 7, 2009, solicitation invited interested parties to submit applications for projects that employ energy efficiency, renewable energy, and advanced transmission and distribution technologies. On March 29, 2010, the Royal Bank of Scotland submitted the first part (Part I) of a two-part application to DOE for a federal loan guarantee. It submitted Part II of its application on August 10, 2010.

1.4.2 County Permitting Overview

The Project Proponent applied for a conditional use permit (CUP) from San Luis Obispo County (County) in July 2008 to develop the Proposed Project at the selected project location. The CUP is needed to allow the proposed use on the Project Site. The County is the lead agency under the California Environmental Quality Act (CEQA). The final decision of the County and applicable state agencies to grant the approvals required to build the Proposed Project will be based in part on an evaluation of its potential environmental effects, its feasible alternatives, and its potential mitigation measures, pursuant to CEQA. A draft environmental impact report (EIR) was released by the County in October 2010. Final approval of the CUP, if granted, is expected in the spring of 2011.

Since the time the Project Proponent submitted its initial CUP application in July 2008, the Proposed Project has evolved based on input received from the County, interested federal and state agencies, community members, and findings of special studies commissioned by the Project Proponent, including biological surveys, wetlands and jurisdictional water surveys, cultural resource surveys, visual simulations, and groundwater and well analyses. The Project Proponent also purchased significant additional land in 2009, incorporated this land into the project study area, and developed two adjacent optional development areas that are being evaluated by the County in its CEQA environmental review process. The Proposed Project evaluated in this EIS and described in detail in Chapter 2 is the same as analyzed in the Draft EIR and incorporates measures developed by the Project Proponent through special studies to avoid, minimize, and/or mitigate for adverse effects of the Project on the human and natural environment. Such measures will likely continue to be refined and/or new measures added during ongoing consultation with agencies with jurisdictional expertise.

1.4.3 Interconnection and Power Purchase Agreements

Interconnection of the Proposed Project to the Morro to Midway 230-kV transmission line requires an interconnection application that is processed under the California Independent System Operator's (CAISO's) Large Generator Interconnection Procedure (LGIP). The LGIP procedure lays out a 24-month timeline of studies and deposit requirements necessary to complete an interconnection agreement. The interconnection agreement specifies the interconnection and network facilities that will be required to interconnect a project. Beginning in 2009, CAISO modified its procedures and placed LGIP applications into groups known as clusters so that projects interconnecting in the same area can be studied together.

The Project Proponent signed two large-generator interconnection agreements with PG&E and the CAISO, one for 210 MW and one for 190 MW. These agreements thus confirmed that at least 400 MW of the project's electricity output would be deliverable to the transmission grid via existing transmission lines. In addition, the Project Proponent executed a long-term purchase power agreement with PG&E, by which PG&E agreed to purchase all of the electricity generated by the facility for a term of 25 years. This agreement was approved by the California Public Utilities Commission (CPUC) in February 2010.

Interconnection of the final 150 MW of the Proposed Project, in addition to other proposed generation facilities in the project area, has been studied by PG&E and the CAISO. In its September 2009 report, *2020 Renewable Transmission Conceptual Plan*, CAISO identified upgrades to the PG&E electrical transmission system that would be required to accommodate solar generation in the Carrizo Plain area as well as other proposed projects in the region. This PG&E Reconductoring Project includes a new interconnection switching station for each solar project and reconductoring 35 miles of 230-kV transmission lines between the Carrizo Plain and PG&E's Midway Substation. Because these upgrades are required to interconnect the final 150 MW of the Proposed Project's generation capacity and other projects in the region, they are being evaluated in the EIS as a connected action (see Section 2.4).

1.5 SCOPE OF THIS ENVIRONMENTAL IMPACT STATEMENT

This EIS presents information on the potential impacts associated with guaranteeing a loan to Royal Bank of Scotland to provide financing to the Project Proponent to construct and start up the Proposed Project. DOE's decision to grant or deny the loan guarantee and the USACE's decision whether or not to issue a CWA Section 404 permit require compliance with NEPA and the interpretive guidelines established by CEQ and DOE's NEPA implementing procedures.

This EIS: (1) describes the affected environment relevant to potential impacts of the Proposed Action and alternatives; (2) analyzes potential environmental impacts that could result from the Proposed Action and alternatives; (3) identifies ways that environmental impacts could be avoided, reduced, or mitigated; (4) identifies and characterizes cumulative impacts that could result from the Proposed Action in relation to other past, present, or reasonably foreseeable future actions; (5) provides DOE with environmental information for use in decision making to protect, preserve, and enhance the human environment and natural ecosystems; and (6) discloses to the public the environmental information and analyses upon which DOE's and USACE's decisions would be based.

The area of analysis of the EIS includes lands within two overlapping study areas, Study Area A and Study Area B. The option to construct the Proposed Project within each of these study areas was proposed by the Project Proponent and is being evaluated by the County in its EIR process and by DOE in this EIS. The study areas consist of lands secured by the Project Proponent with options to purchase for development of the Proposed Project. Upon conclusion of the EIR process, a project within one of these study areas will be permitted by the County for development of the solar facility.

1.6 PUBLIC PARTICIPATION

Public participation is an integral part of the NEPA process. Federal public participation activities conducted in support of this EIS are described below.

1.6.1 Scoping

Project scoping identifies issues of concern early in the EIS process. NEPA requires that the lead agency invite affected federal, state, and local agencies, any affected Native American tribes, and other interested persons to participate in the scoping process. The purpose of this scoping process is:

(1) To inform the public about a proposed action and the alternatives being considered; and

(2) To identify and clarify issues relevant to the EIS by soliciting public comments.

On October 22, 2010, DOE published a Notice of Intent (NOI) to prepare this EIS in the *Federal Register* (75 Fed. Reg. 65306), initiating a 30-day public scoping period. The NOI was published in the *San Luis Obispo Tribune* on October 29 and 31, 2010, the *Atascadero News* on October 29, 2010, and the *Paso Robles Press* on October 29, 2010, and mailed to federal, state, and local agencies, Native American tribes, special interest groups, and landowners soliciting information regarding environmental impacts that could potentially occur as a result of the Proposed Project. Copies of these materials are included in Appendix A of this EIS.

A public scoping meeting was held on November 16, 2010, at the Carrisa Plains Heritage Community Center. Approximately 30 persons attended the scoping meeting. Nine people entered comments into the public record during the public hearing portion of the meeting.

The scoping period ended on November 22, 2010. Seventeen written comment letters were received. Comment letters were submitted by the EPA, California Department of Forestry and Fire Protection (Cal Fire)/San Luis Obispo Fire Department, the County of San Luis Obispo, the Center for Biological Diversity, the Defenders of Wildlife/Sierra Club/Audubon California (submitted as one letter), and twelve individuals or their representatives that reside near the Project Site.

Some comments expressed support for the construction of the Topaz Project. Other comments expressed concern about the Project and identified the proposed Project Site as biologically valuable, for example, because of the presence of functional sensitive habitat and the potential to host a large number of rare biological resources. Comments expressed concern with regard to: site selection; impacts on sensitive biological resources, including sensitive habitat, protected species (e.g., the Federally protected San Joaquin Kit Fox), and wildlife movement; water quality and quantity in terms of the limited nature of water resources and potential impacts to sensitive and locally-rare species; impacts on on-site drainage; full identification of sensitive habitats and species of the Carrizo Plain; impacts on nesting and foraging birds and bald and golden eagles; impacts from disposal of hazardous materials contained in PV panels; and the effects and causes of climate change. In addition, comments concerned the Proposed Project's consistency with local land use plans and existing land uses in the area, proximity to the Carrizo Plains National Monument, and seismic hazards.

The primary issues raised in the oral and written comments are presented in **Table 1-1**, Summary of Scoping Issues.

TABLE 1-1
SUMMARY OF SCOPING ISSUES

ISSUE	SUMMARY OF ISSUE	LOCATION WHERE ISSUE IS ADDRESSED IN THE EIS
Alternatives Analysis	Include a robust discussion of alternatives, including alternative sites, capacities, and technologies. Include alternatives to avoid or mitigate potential adverse impacts on biological resources. Identify an environmentally preferable alternative.	Section 2.1.2 provides information on the DOE alternative selection process. Section 2.1.3 describes project-specific alternatives and project-specific alternatives considered but eliminated.
	Evaluate alternative locations for the site, including in the Westlands Competitive Renewable Energy Zone; alternatives to utility-scale solar, including rooftop solar and smaller facilities located closer to users; and more efficient solar panels..	
	Evaluate providing funding to other types of projects.	
Biological Resources	Evaluate impacts on protected species and on wildlife connectivity.	Section 3.10 describes special status species in the project area and wildlife connectivity.
	Evaluate impacts related to the introduction of lighting, noise, loss and disruption of habitat on species in the area, including locally rare species.	Sections 3.8, 3.9, and 3.10 describe vegetation, wildlife, and special status species, respectively.
	Provide a full accounting of all flora and fauna on the Project Site, a thorough analysis of project and cumulative impacts, and a description of measures to avoid, minimize, and mitigate project impacts. Adopt protocol to perform seasonal surveys for sensitive plant and animals as part of site characterization and monitoring.	Sections 3.8, 3.9, and 3.10 describe vegetation, wildlife, and special status species, respectively. Measures proposed to minimize impacts are included in these sections and in Table 2-9. Cumulative effects are described in Section 3.18. Noxious weeds are discussed in Section 3.8.
	Measures to prevent the spread of noxious weeds should be included.	Measures proposed to minimize impacts are in Table 2-9 and the "Topaz Solar Farm San Joaquin Kit Fox Conservation and Monitoring Plan," included in Appendix E.
	Impacts to the safety of the San Joaquin kit fox and fencing.	
Cadmium Telluride	Analyze the ability of cadmium telluride (CdTe) and cadmium sulfide (CdS) to enter environmental pathways through breakage or fire.	Section 3.15 discusses potential effects of CdTe modules. Section 2.3.4 describes module decommissioning and recycling.
	Discuss the long-term reliability of encapsulation, emissions from broken modules in arid environments, the number of broken or cracked panels that could be stockpiled on site, and the ability to fight fires using water.	
	Provide information on end-of-life treatment of panels.	

TABLE 1-1 *(continued)*
SUMMARY OF PRIMARY SCOPING ISSUES

ISSUE	SUMMARY OF ISSUE	LOCATION WHERE ISSUE IS ADDRESSED IN THE EIS
Water Resources	Estimate the quantity of water the Proposed Project will require, describe the source of this water, and evaluate the effects on other water users and natural resources in the project area.	Section 3.7 discusses groundwater supply, surface waters, floodplains, wetlands, and Waters of the US.
	Analyze the impacts of the Proposed Project on downstream waters.	
	Analyze impacts on jurisdictional waters and wetlands.	
Visual Resources	Describe project-specific and cumulative impacts on the visual character of the area and on nearby landowners from large-scale solar development.	Section 3.3 describes the potential visual impacts related to the Proposed Project.
	Evaluate glare and effects on the night sky.	
Air Quality	Describe impacts on air quality and measures to reduce impacts.	Section 3.4 describes potential air quality impacts. Air quality measures are described in Section 3.4 and in Table 2-9.
Noise	Disclose noise impacts during construction and operation of the solar facility.	Section 3.5 discusses potential noise impacts.
Prime Farmlands	The Proposed Project would affect prime farmlands.	Section 3.1 discusses prime farmlands.
Environmental Justice	Evaluate Proposed Project impacts on minority populations and on schoolchildren at Carrisa Plains Elementary School.	Environmental justice issues are discussed in Section 3.14.
Cumulative Impacts	Evaluate the cumulative impact of large-scale solar projects on resources such as sensitive species and habitat, water supply, traffic, hazardous materials, and the visual environment.	Cumulative impacts are discussed in Section 3.18.

1.7 DOCUMENT ORGANIZATION

This EIS has been organized into the following sections. A list of acronyms and abbreviations follows the Table of Contents, while appendices follow the chapters described below.

Chapter 1, Purpose and Need, describes the purpose and need for the Proposed Project, for DOE issuing a loan guarantee, and for USACE issuing a CWA Section 404 permit; the background of the DOE Loan Guarantee Program,; the scope of the analysis; and public participation. It also describes the organization of the EIS.

Chapter 2, Proposed Action and Alternatives, describes the Proposed Action, project-specific alternatives, project-specific alternatives eliminated from further consideration, the no action alternative, and a connected action. A summary of mitigation measures and required permits is also provided.

Chapter 3, Affected Environment and Environmental Impacts, describes the existing baseline conditions of the resources that may be affected by implementing the Proposed Action, including land use, visual resources, air quality and climate change, noise, geology and soils, water resources, vegetation, fish and wildlife, special status species, cultural resources, paleontological resources, socioeconomics, environmental justice, public health and safety and hazardous materials and wastes, transportation, and infrastructure. It also describes the potential direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives described in Chapter 2.

Chapter 4, Other Required Considerations, describes unavoidable adverse environmental impacts, short-term uses of the environment and long-term productivity, and irreversible or irretrievable commitments of resources resulting from the Proposed Action and alternatives.

Chapter 5, Consultation and Coordination, provides a list of agencies contacted regarding this EIS.

Chapter 6, List of Preparers, provides a brief description of credentials for the preparers of the EIS.

Chapter 7, References, describes the sources of information used in preparing the EIS.

Chapter 8, Glossary, defines technical terms used in the EIS.

Chapter 9, Index, provides a page-number listing of topics that are discussed in the EIS.

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

Chapter 2 describes in detail the Proposed Action; project-specific alternatives, including project-specific alternatives eliminated from further consideration; and the no action alternative. The chapter includes an overview of the Proposed Project and provides detailed technical information on the Proposed Project that forms the basis for the analyses in this EIS; permits, approvals, and authorizations required to construct the Project; and proposed measures designed to reduce impacts from the Project. The chapter also describes a connected action.

2.1 DOE'S PROPOSED ACTION AND ALTERNATIVES

2.1.1 Proposed Action

DOE's Proposed Action is to issue a federal loan guarantee to Royal Bank of Scotland to provide funding to the Project Proponent for the construction and startup of the Proposed Project, a nominal 550-MW solar energy generating facility. The Project, as proposed by the Project Proponent, is described in detail in Section 2.3 and would consist of a solar field of ground-mounted PV modules, an electrical collection system, a substation, and a new PG&E switching station that interconnects the Proposed Project to an existing PG&E transmission line. Collector lines, access roads, fencing, a monitoring and maintenance facility, and a Solar Energy Learning Center would also be developed.

2.1.2 DOE Selection of Alternatives

NEPA and the CEQ implementing regulations require that agencies discuss the reasonable alternatives to the proposed action in an EIS. The term "reasonable alternatives" is not self-defining, but rather must be determined in the context of the statutory purpose expressed by the underlying legislation. Under Section 1703 of Title XVII of EPAct 2005, Congress authorizes the Secretary of Energy to make loan guarantees for projects that "(1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and (2) employ new or significantly improved technologies as compared to commercial technologies

in service in the United States at the time the guarantee is issued." Under ARRA, Congress established a temporary program under Section 1705 of Title XVII of EPAct 2005 authorizing DOE to make loan guarantees to encourage rapid deployment of certain renewable energy systems, electric transmission systems, and leading-edge biofuels projects. These projects do not need to employ innovative technologies as under Section 1703, but do need to commence construction no later than September 30, 2011. Provided that an applicant for a loan guarantee meets the eligibility requirements under Title XVII, the Secretary of Energy may select that applicant among any other eligible applicants to the extent that adequate funds have been appropriated.

DOE issued Solicitation No. DE–FOA–0000166 on October 7, 2009, inviting the submission of applications for loan guarantees under Section 1705 of the EPAct 2005. The solicitation was for the Financial Institutional Partnership Program for commercial renewable power generation, including solar energy technologies. Past solicitations issued by DOE have targeted fossil energy advanced technologies; renewable energy and advanced transmission and distribution technologies; nuclear power facilities; and advanced nuclear facilities for the 'front-end' of the nuclear fuel cycle. DOE evaluated the applications it received in response to Solicitation DE-FOA-0000166 and determined that the Project Proponent was eligible in accordance with Section 1705 of the EPAct 2005. The Project Proponent was thus invited to enter the due diligence process.

In accordance with the solicitation, applicants were required to submit environmental reports to assist the DOE in meeting its NEPA obligation under 10 CFR 1021.216, and in determining the appropriate level of NEPA review for a project if selected for a loan guarantee. The Project Proponent submitted an environmental summary report for the Proposed Project in conjunction with its Part I application on March 29, 2010. The environmental report provided details about the Project, including the planned location, technology, proposed facilities, regulatory aspects, and potential benefits. The environmental report also described project-specific alternatives considered by the Project Proponent, as discussed in Section 2.1.3, below, and potential impacts of the Proposed Project on the same environmental resources addressed in this EIS.

It is well established that an agency should take into account the needs and goals of the applicant in determining the scope of the EIS for an applicant's project as well as the statutory purposes of the underlying legislation. Rather than being directly responsible for the siting, construction, and operation of respective projects selected in response to solicitations under EPAct 2005, DOE's actions under the act are limited to guaranteeing private financing secured by applicants for the project that they have submitted in their application. Therefore, DOE's overall decision will be to either provide a loan guarantee for the Proposed Project (Proposed Action) or to decline to provide a loan guarantee (no action alternative). Project-specific alternatives analyzed in detail, as well as project-

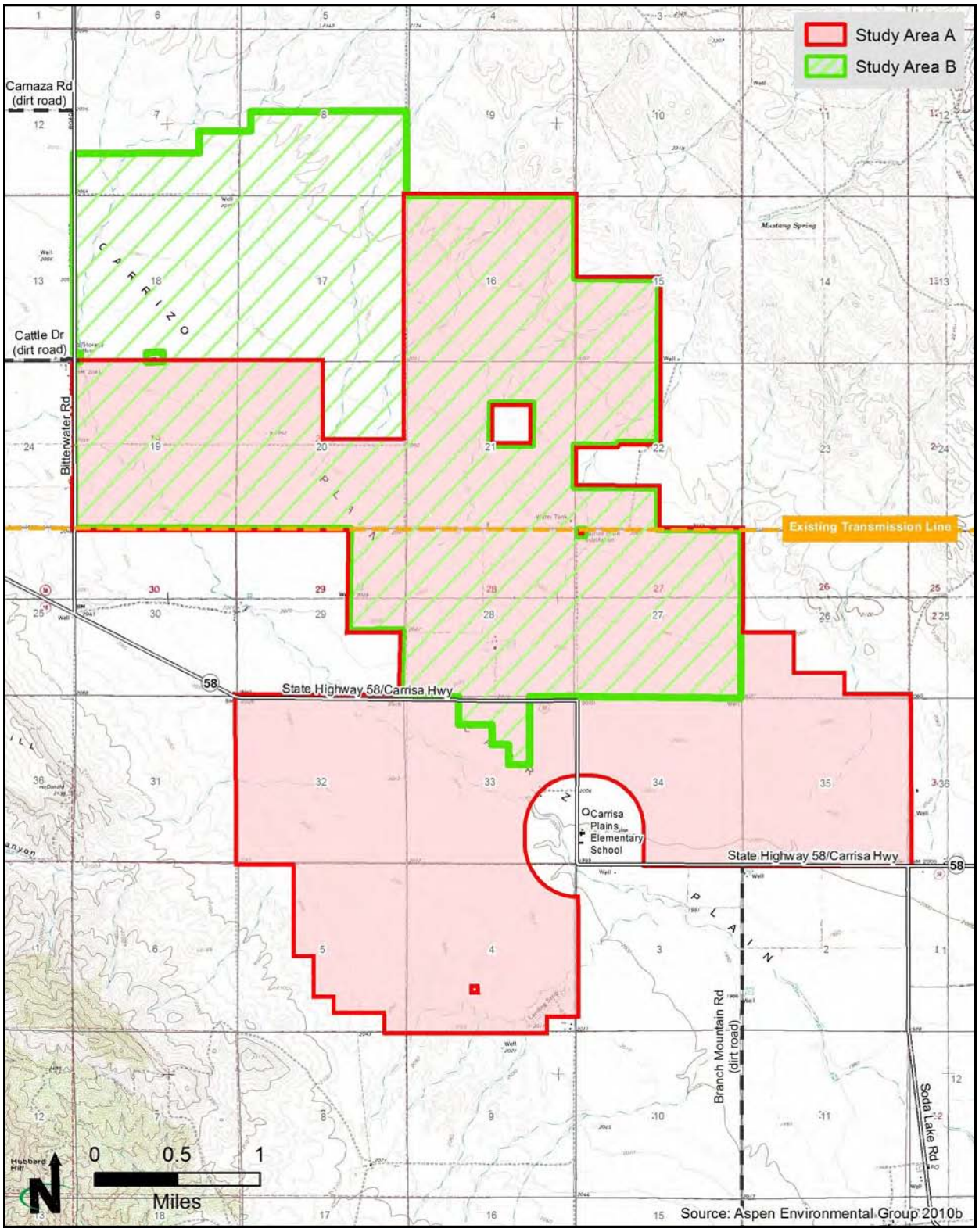
specific alternatives eliminated from further consideration, are described in Section 2.1.3, below.

2.1.3 Project-Specific Alternatives

The Project Proponent has secured options to purchase nearly 10,000 acres of land and is proposing to construct a 550-MW PV solar facility on up to 4,100 acres of these lands. The Project Proponent is in the process of obtaining entitlements (the rights to develop the solar facility) for the Proposed Project from the County of San Luis Obispo. Because the exact development footprint is not yet known, the entire 10,000 acres are described in this EIS, potential development areas are identified, and potential impacts associated with development on these areas are disclosed. While the EIS evaluates the potential effects on all developable project lands, development would be limited to the maximum 4,100-acre solar facility footprint permitted by the County. The following terms are used in the EIS:

- Project Site – This term refers to the approximately 10,000 acres that have been secured by the Project Proponent to undergo full environmental analysis. The Project Site contains both physical and environmental constraints that would be avoided under all project-specific alternatives.
- Study Area – The Project Site has been divided into two overlapping study areas, Study Area A and Study Area B, on which the Proposed Project could be developed (**Figure 2-1**, Study Area Map). Each study area contains features and attributes that would allow the County of San Luis Obispo to optimize protection of certain resource areas or avoid and minimize certain potential environmental impacts in the CUP it issues for the facility. These study areas were evaluated as discrete alternatives in the County's Draft EIR for the Project and are presented as project-specific alternatives in this EIS. However, the County could permit a facility that uses some lands within both study areas, though the overall size of the facility would be limited to a maximum of 4,100 acres.

  In its CEQA environmental review, the County of San Luis Obispo considered specific development options within each study area. Option areas refer to the fenced development areas within the Project Site that would comprise the 550-MW PV solar facility; option areas are smaller areas within the larger study areas. The EIR evaluated Option A, which was a specific development proposal within Study Area A, and Option B, which was a specific development proposal within Study Area B. The EIR also evaluated other project configurations within Study Area A, other project configurations within Study Area B, and some project configurations



The Project Proponent is proposing to develop the Topaz Solar Farm in one of two study areas. The decision on the final facility configuration will be made by the County of San Luis Obispo through its conditional use permitting process.

Study Area Map

Topaz Solar Farm
San Luis Obispo County, CA

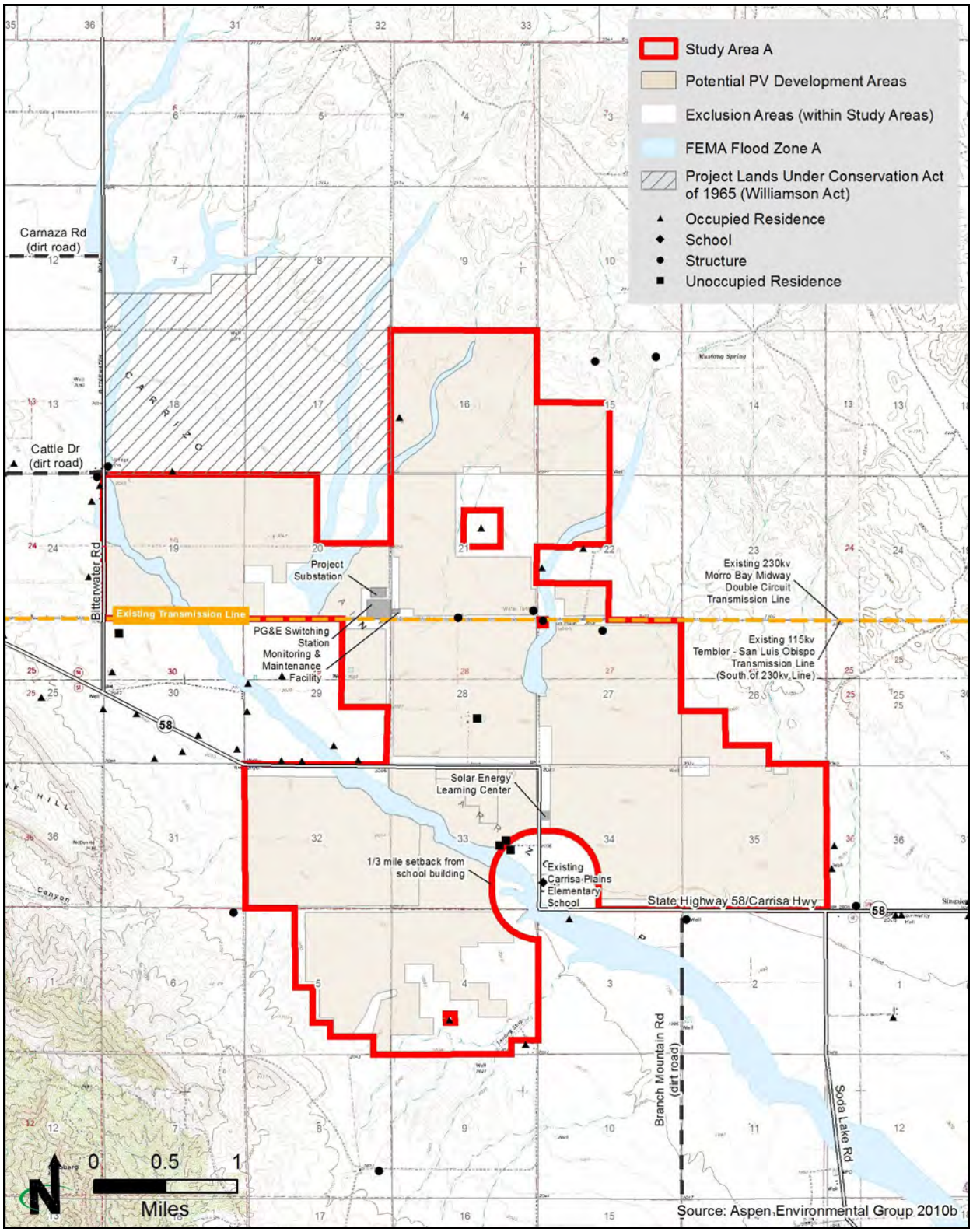
Figure 2-1

that included lands in both Study Area A and Study Area B. These various project configurations were intended to lessen impacts on different resources depending upon the project configuration. Because the final array configuration will not be determined until the conclusion of the County permitting process in mid-2011, specific array configurations are not evaluated in this EIS. Rather, the EIS evaluates the effects of developing the Project on up to 4,100 acres within Study Area A (though the Project Proponent's current preferred array layout is only 3,400 acres) or up to 4,000 acres within Study Area B. These scenarios are termed "project-specific alternatives", or simply alternatives, in the EIS.

- Alternatives – Two alternatives for developing the Proposed Project have been proposed by the Project Proponent and are analyzed in detail in the EIS as project-specific alternatives. Each alternative would contain virtually identical project features configured in different areas of the overall Project Site; these features are described in detail in Section 2.3, Project Description. The two alternatives for developing the Proposed Project are described below.

  Alternative A: Develop the Proposed Project in Study Area A
  Under Alternative A, the Proposed Project would be developed on up to 4,100 acres of a larger 7,800-acre study area termed Study Area A. Study Area A is approximately one mile north of the community of California Valley and six miles northwest of the Carrizo Plain National Monument. This study area encompasses the southern three-quarters of the 10,000 acres that have been secured by the Project Proponent. **Figure 2-2,** Alternative A, details the location of the Proposed Project substation, switching station, monitoring and maintenance facility, and Solar Energy Learning Center, as well as potential areas in which PV arrays could be located within Study Area A.

  Alternative B: Develop the Proposed Project in Study Area B
  Under Alternative B, the Proposed Project would be developed on up to approximately 4,000 acres of a larger 6,300-acre study area termed Study Area B. Study Area B is approximately two miles north of the community of California Valley and seven miles northwest of the Carrizo Plain National Monument. This study area encompasses the northern two-thirds of the 10,000 acres that have been secured by the Project Proponent. As shown in Figure 2-1, all but approximately 160 acres of the Study Area B lands that do not overlap with Study Area A lands are under California Land Conservation Act (Williamson Act) contract. **Figure 2-3,** Alternative B, details the location of the Project substation,

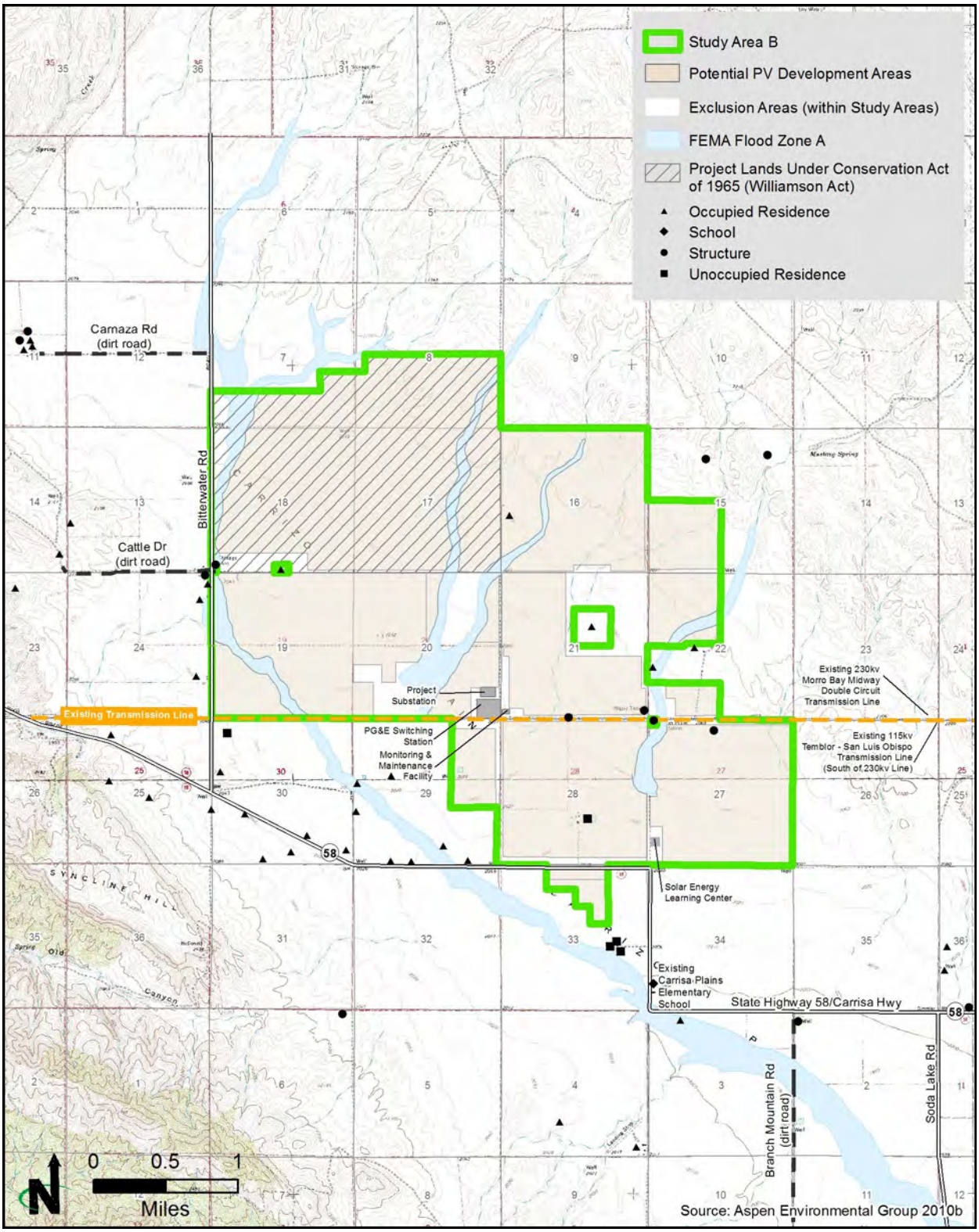


Under Alternative A, the proposed Topaz Solar Farm would be developed on up to 4,100 acres. This alternative would avoid development of lands under Williamson Act contract.

Alternative A

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-2



Under Alternative B, the proposed Topaz Solar Farm would be developed on up to approximately 4,000 acres of the 6,300-acre study area. This alternative would avoid most development south of Highway 58.

Alternative B

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-3

switching station, monitoring and maintenance facility, and Solar Energy Learning Center, as well as potential areas in which PV arrays could be located within Study Area B. Because the final Project design would not be determined until the completion of the County's permitting and CEQA environmental review processes in mid-2011, the EIS analyzes potential effects associated with development on the entire Project Site, excluding areas of physical and environmental constraints, to capture the full range of potential environmental effects. For this reason, Figures 2-2 and 2-3 show potential PV array development areas rather than specific PV array locations. Because all areas of the Project Site that could be developed are analyzed in the EIS, the impacts associated with any potential panel configuration ultimately permitted by the County have been disclosed in this document.

Comparison of Project-Specific Alternatives

Both alternatives would consist of similarly sized solar generating equipment, a Project substation, a switching station, a monitoring and maintenance facility, a Solar Energy Learning Center, and infrastructure such as roads and fencing. The Project substation, switching station, and monitoring and maintenance facility would be sited in the same location under both alternatives. **Table 2-1**, Comparison of Project-Specific Alternatives, provides a comparison of Alternative A and Alternative B. Other features described in Section 2.3 would be the same under each alternative.

TABLE 2-1
COMPARISON OF PROJECT-SPECIFIC ALTERNATIVES

PROJECT ELEMENT	ALTERNATIVE A	ALTERNATIVE B
Study Area (acres)	7,800	6,300
Developed Area (acres)	up to 4,100	up to 4,000
Overhead 34.5-kV Collector Lines (miles)	12	8
Access Roads (miles)	22	22

Project-Specific Alternatives Considered but Eliminated

Because DOE's decision in the context of the EPAct 2005 is strictly whether to provide or deny a federal loan guarantee for the Proposed Project, other alternatives available to DOE for agency action are not considered reasonable. The EIS nonetheless analyzes a range of reasonable project-specific alternatives to the Proposed Project itself. The alternatives that were considered but not carried forward for detailed analysis include alternative site locations, alternative project sizes, and alternative technologies. These alternatives did not meet the Project purpose and need described in Section 1.3.1, as discussed below, or are eliminated for other reasons stated herein.

Alternative Site Locations

Because the DOE loan guarantee program evaluates applicant-proposed projects, DOE has not participated in the identification or selection of alternative sites for the Proposed Project. Furthermore, no off-site locations are considered reasonable or feasible, as described below. Thus, no alternative off-site locations are carried forward for detailed analysis in the EIS.

The Project Proponent's site selection process, as well as an overview of off-site alternatives examined by the County in the Draft EIR, are discussed below.

Site Selection Process

The Project Proponent initiated development of the Proposed Project in 2006, when it began looking for a suitable location to develop a solar facility. In selecting a suitable solar facility location, the Project Proponent considered a number of criteria, including electrical transmission access and available capacity, solar resource potential, and land suitability (availability of disturbed land, flat topography, and low environmental sensitivity).

Transmission Line Access and Available Capacity. Proximity to existing transmission corridors decreases the cost and environmental impacts of a project by avoiding the need for a new generation tie-in line or minimizing the distance of such a line if required, or substantial new transmission network upgrades. In addition to proximity, transmission lines need to have available capacity to carry electricity generated by a project.

The Project Proponent evaluated the availability of electric transmission capacity in Pacific Gas and Electric's (PG&E's) service territory and electrical grid system integration factors such as transmission line length and system upgrade requirements. PG&E's Morro Bay to Midway transmission line, which runs from the coast of San Luis Obispo County, east through the Carrizo Plain, and eventually into Kern County in the San Joaquin Valley, provided the opportunity to interconnect the Proposed Project at a point on the system with available electric transmission capacity for a significant majority of the 550-MW project, and which offered the opportunity to site a solar facility immediately adjacent to the line, thereby avoiding the need to develop new transmission line rights-of-way. The availability of lands adjacent to this line would enable the connection of the Proposed Project directly to the transmission line and avoid the need to construct a generation tie-in line.

Land Suitability. Utility-scale solar facilities require large tracts of relatively flat terrain. These lands should be a low-value land use (for example, not in highly productive agricultural use) and previously disturbed so as to minimize environmental impacts from construction and operation.

The Project Proponent evaluated the lands along the Morro Bay to Midway transmission line to determine an appropriate location to develop the Proposed Project. Much of the land along the eastern portion of the transmission line in Kern County is in highly productive agricultural use and is divided into relatively small parcels. Many of the properties in Kern County also contain underground

mineral resources that continue to support oil and gas production and are topographically unsuitable for solar development. Moving west along the Morro Bay to Midway transmission line into San Luis Obispo County, it was necessary to avoid environmental resources in the Lokern Preserve, along the western flank of the Temblor Mountains, the Carrizo Plain National Monument, and the highly sensitive areas between the western edge of the Carrizo Plains and the Pacific Coast.

Solar Resource Potential. Solar resource potential is determined by the amount of solar energy present and by the percentage of available sunlight that can be converted into electricity. Factors that influence the amount of solar energy available include the following:

- Latitude: southern latitudes have a more direct exposure to the sun and a higher level of solar energy;
- Elevation: solar energy is greater at high elevations because there is less atmosphere to absorb and scatter sunlight;
- Climate: Drier climates have more solar energy due to fewer cloudy or foggy days; and
- Haze: in remote areas with less intensive agriculture there are less dust, aerosols, and humidity, allowing more solar energy to reach the ground surface.

In evaluating the lands that were suitable for solar development, discussed above, the Project Proponent identified the Carrizo Plain as having the highest level of solar energy in the PG&E service area due to its relatively high elevation, protected microclimate, and low humidity and haze.

Through this search, the Project Proponent determined that the Morro Bay to Midway transmission line had available capacity and that the California Valley area of the Carrizo Plain had high solar resource potential, relatively flat terrain, and disturbed available land that was not in productive agricultural use. As a result, the Project Proponent selected the proposed project area in eastern San Luis Obispo County and secured options to purchase land from landowners in the project area to develop the solar facility.

County-Evaluated Off-Site Alternatives

While the Project Proponent is not proposing any alternate site locations, the County of San Luis Obispo identified the following two off-site locations for analysis in the Draft EIR for the Proposed Project (San Luis Obispo County 2010a).

Westlands Competitive Renewable Energy Zone (CREZ) Alternative. The Westlands CREZ is a 30,000-acre area with a moderate solar resource potential in Kings and Fresno Counties. This zone consists of disturbed farmlands that have been retired due to water shortages and salt buildup in the soil that makes it toxic to crops. The Westlands CREZ is not considered a valid alternative because of the lower solar resource potential (the lower elevation and

increased humidity/haze of the site would result in an estimated five to ten percent solar resource loss), the uncertainty of transmission line capacity (transmission infrastructure exists in the area but studies would be required to determine if adequate capacity exists or whether new or upgraded transmission would be required), and the creation of potential impacts similar to those that would result from developing the Proposed Project at the proposed location in San Luis Obispo County. In addition, the need for project siting, design, surveys, and permitting would delay project generation beyond the currently proposed buildout date, which would not meet the Project's purpose and need of helping to meet federal, state, and regional renewable energy laws, regulations, goals, and policies described in Section 1.3.1. This alternative would also not meet DOE's purpose and need of providing loan guarantees to eligible projects that meet the goals of the EPAct 2005, as amended by ARRA, including accelerating commercial use of new or improved energy technologies and realizing substantial environmental benefits through the avoidance of greenhouse gas emissions, as described in Section 1.3.2.

North Carrizo Plain Alternative. The second off-site location evaluated in the Draft EIR was the North Carrizo Plain, specifically the Cholame Valley between Monterey County and northwestern San Luis Obispo County. This area has the same solar resource potential as the proposed Project Site and no residences in the project area but may require a new 30-mile 230-kV transmission line to connect the Proposed Project to the grid. Similar to the Westlands CREZ location, developing the solar facility in the North Carrizo Plain would delay bringing renewable power to market and would likely create greater impacts on some resources in the name of reducing impacts on other resources as compared with the proposed Topaz project location (San Luis Obispo County 2010a). As discussed above for the Westlands CREZ, this alternative would not meet the Project's purpose and need described in Section 1.3.1 or DOE's purpose and need described in Section 1.3.2, and it is not otherwise a reasonable alternative.

Alternative Sizes

Consistent with the nature of its loan guarantee decision, DOE did not participate in the sizing of the power generation facilities for the Proposed Project. Decisions about the size and generating capacity of the Proposed Project were made by the Project Proponent to ensure the economic feasibility of the Project. As the potential guarantor of private loans, DOE must consider the economic decisions made by the Project Proponent as essential to the viability of the Project for repayment of those loans; therefore, DOE is not in the position of evaluating alternative generating capacities, which may not be considered economically feasible by the proponent. Nonetheless, any reduced generating capacity alternative would not be reasonable because it would not meet the Project's purpose and need of helping to meet federal, state, and regional renewable energy laws, regulations, goals, and policies described in Section 1.3.1.

Alternative Technologies

As DOE evaluates applicant-proposed projects, it does not participate in technology selection decisions. No technologies other than PV solar and no other types of PV solar technology were considered for the Proposed Action, as the Project Proponent would use the solar module technology that it developed and manufactures.

The Draft EIR for the Proposed Project evaluated a distributed solar PV alternative (rooftop systems that deliver power directly to or near its area of use) and other solar technologies such as solar thermal and eliminated these alternatives from detailed consideration because they would not be feasible alternatives for 550-MW of power generation in the case of distributed systems and because the impacts associated with other types of solar technologies would be the same or more intense than a PV solar facility. DOE believes, for the same reasons, that these alternative technologies are not reasonable alternatives under NEPA.

2.1.4 No Action Alternative

Under the no action alternative, DOE would not provide a loan guarantee for the Proposed Project. In the absence of a DOE loan guarantee, the Project Proponent could still elect to construct and operate the proposed solar facility if it could obtain alternate sources of financing and the required permits from state and federal agencies; therefore, the DOE no action alternative could result in one of two potential scenarios:

- The Proposed Project would not be built; or
- The Proposed Project would be built by the Project Proponent without benefit of a loan guarantee.

Without DOE participation, it is possible that the Proposed Project would be canceled. For the purposes of analysis in this EIS, the DOE no action alternative will be a "No Build" alternative, meaning that environmental conditions would remain in the status quo and current land uses would continue. This scenario would not contribute to the federal loan guarantee program goal to make loan guarantees for energy projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases" or ARRA goals for rapid deployment of eligible renewable energy projects.

While the "No Build" alternative is analyzed throughout the EIS, because the Project Proponent owns or controls the land proposed for development, it is possible that the Proposed Project would be constructed without benefit of a loan guarantee. DOE assumes that if the Project Proponent were to proceed with construction in the absence of a loan guarantee, the Project would include all of the features, attributes, and impacts as described for the Proposed Action. However, because of the need to obtain alternate sources of funding, the time it would take to bring the Proposed Project online would likely be increased under this scenario. Therefore, for resources where impacts would differ

substantially from the Proposed Action, either due to an increased timeline or other reasons, these impacts would be described in Chapter 3, under the no action alternative discussion.

2.2 USACE'S PROPOSED ACTION AND ALTERNATIVES CONSIDERED

2.2.1 Proposed Action

Construction of the Proposed Project requires a US Army Corps of Engineers permit pursuant to Section 404 of the CWA, along with appropriate NEPA analysis. As part of a separate CWA alternatives analysis in accordance with the Section 404(b)(1) Guidelines (40 CFR Part 230), USACE will incorporate into their NEPA analysis an evaluation of the potential impacts on the aquatic environment resulting from the construction and operation of the Topaz Solar Farm. This regulatory process requires selection of the least environmentally damaging practicable alternative, which would reduce the impacts on waters of the US, over which USACE has jurisdiction, as long as the alternative meets the Project Proponent's overall project purpose and so long as the alternative does not have other significant adverse environmental consequences.

The Section 404(b)(1) Guidelines state:

> …no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 CFR § 230.10(a)).
>
> An alternative is considered practicable "…if it is available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes" (40 CFR § 230.10(a)(2)).

The CWA "overall purpose" of the Proposed Project is to increase the availability of electricity generated from renewable energy sources through the development, in a high-solar resource area, of a 550-MW PV solar power plant and associated transmission and support facilities for interconnection to the Morro Bay to Midway 230-kV transmission line within eastern San Luis Obispo County, California.

2.2.2 No Action Alternative

Under the no action alternative, the Proposed Project would not be constructed.

2.3 PROJECT DESCRIPTION

2.3.1 PV Solar Energy Technology

PV technology converts solar radiation from the sun into DC electricity. When light shines on PV modules, a percentage of the light is absorbed. The energy of the absorbed light is transferred to electrons in the atoms of the PV cell. With their newfound energy, these electrons escape from their normal positions in the atoms of the semiconductor PV material and become part of the electrical flow, or current, in an electrical circuit. **Figure 2-4**, PV Technology Illustration, provides a schematic of how the Proposed Project would generate electricity and transfer it to the PG&E transmission grid.

2.3.2 Proposed Project Features

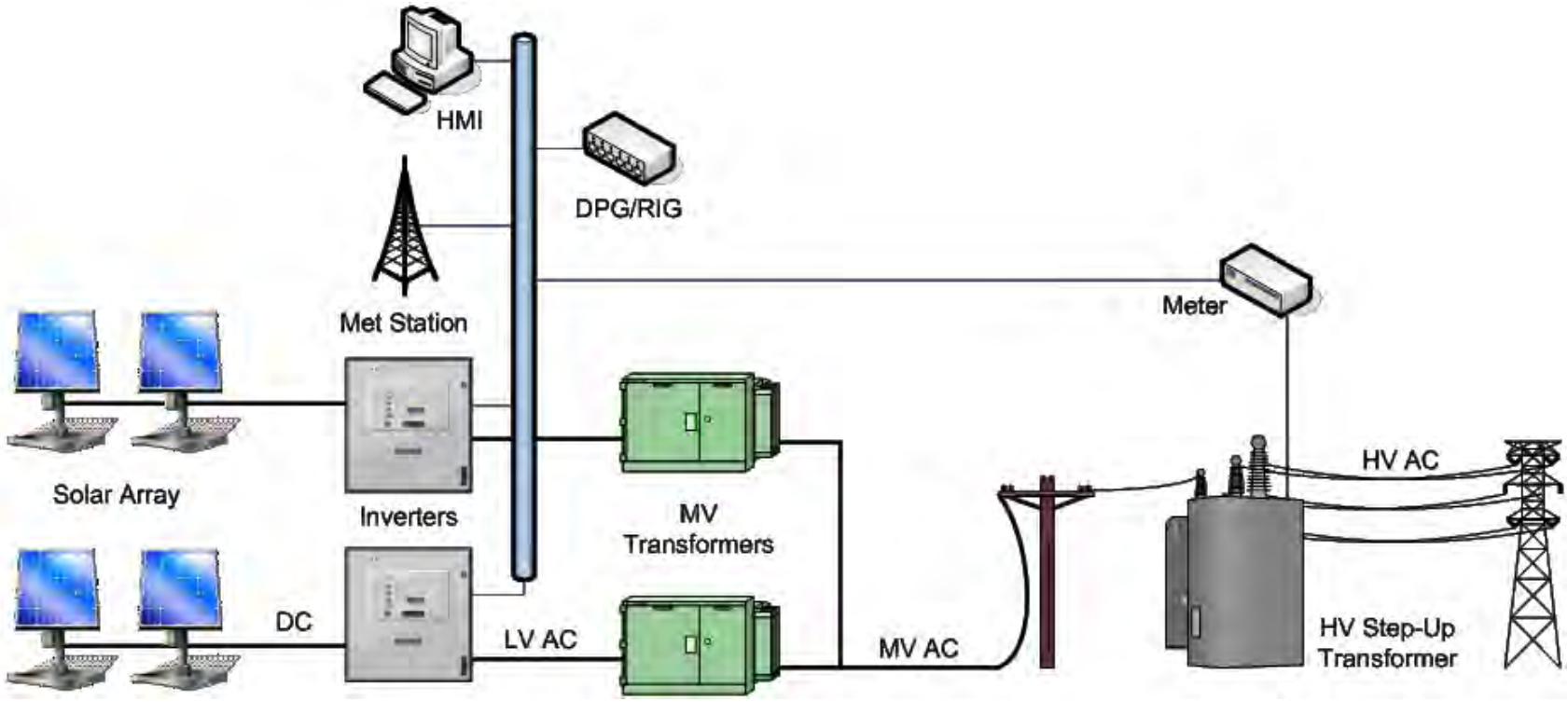
The Proposed Project would consist of the solar generating equipment, a Project substation, a switching station, a monitoring and maintenance facility, a Solar Energy Learning Center, and infrastructure such as fencing and access road improvement. These elements are described below.

Solar Generating Equipment

The Proposed Project would utilize First Solar thin-film CdTe PV modules. The PV modules would be organized into up to 460 electrical groups called arrays, with the cumulative capacity to generate 550 MW of power at the point of delivery to PG&E under peak solar conditions.

The solar field would consist of PV modules mounted on steel support structures called tables. Tables would be attached at an angle to a bracket on vertical steel posts spaced approximately eight to ten feet center-to-center and driven into the ground to a depth of four to seven feet below grade. Once mounted, the front of each table would be approximately 1.5 feet above grade, while the rear would be approximately 5.5 feet above grade. The distance from the ground to the top of the PV module table may vary depending on the topography.

The PV array components could be configured into arrays in multiple ways within the Proposed Project fenced area. One configuration would be arrays consisting of 36 rows, which would produce approximately 1.3 megawatts alternating current (MW_{AC}) of power. Another configuration would be arrays consisting of 56 rows, which would produce 2.52 MW_{AC} of power. The arrays would be sectioned into quadrants by two 20-foot-wide corridors, one running east-west, and the other running north-south. Other configurations may be developed prior to obtaining construction permits for the Project. The Project components would be the same for each array configuration, and the site layout would contain approximately the same (or slightly less) impacted area.



DC—Direct Current
LV—Low Voltage
Met Station—Meteorological Station

AC—Alternating Current
MV—Mid Voltage
DPG/RIG—Data Processing Gateway/Remote Intelligent Gateway

HMI—Human-Machine Interface
HV—High Voltage

SOURCE: Topaz Solar Farms, LLC

PV technology converts solar radiation from the sun into DC electricity. The proposed Topaz Solar Farm would utilize First Solar thin-film cadmium telluride (CdTe) PV modules.

PV Technology Illustration

Topaz Solar Farm
San Luis Obispo County, CA

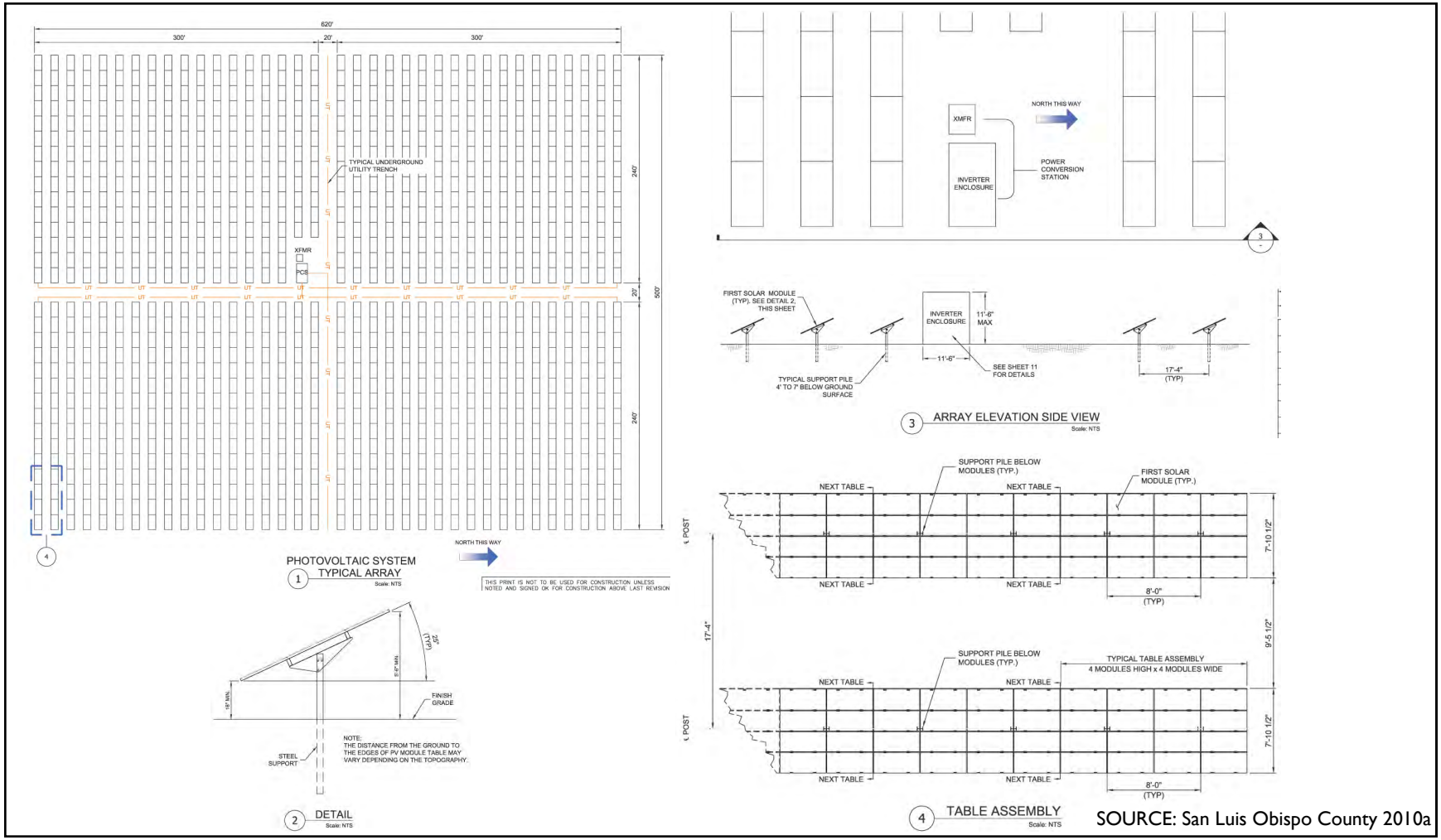
Figure 2-4

A typical PV array is depicted on **Figure 2-5**, PV Array Schematic. A photograph of a PV array is provided below. The photo is meant to provide an example of a PV array only; the actual design may vary from what is shown here.

Typical PV Panel Array

The PV modules would be electrically connected by wiring harnesses running along the bottom of each table to combiner boxes that collect power from several rows of modules. The combiner boxes would feed DC power from the modules to the power conversion station (PCS) via underground cables. The inverters in the PCS would convert the DC electric input into AC electric output, and the transformer would step up the current to 34.5 kV for on-site transmission of the power to the PV combining switchgear (PVCS). **Figure 2-6,** Power Conversion Station Schematic, provides an illustration of one possible layout of the inverters and transformers that make up the PCS. Photos of a typical inverter and transformer are provided below.

Typical Inverter Enclosure



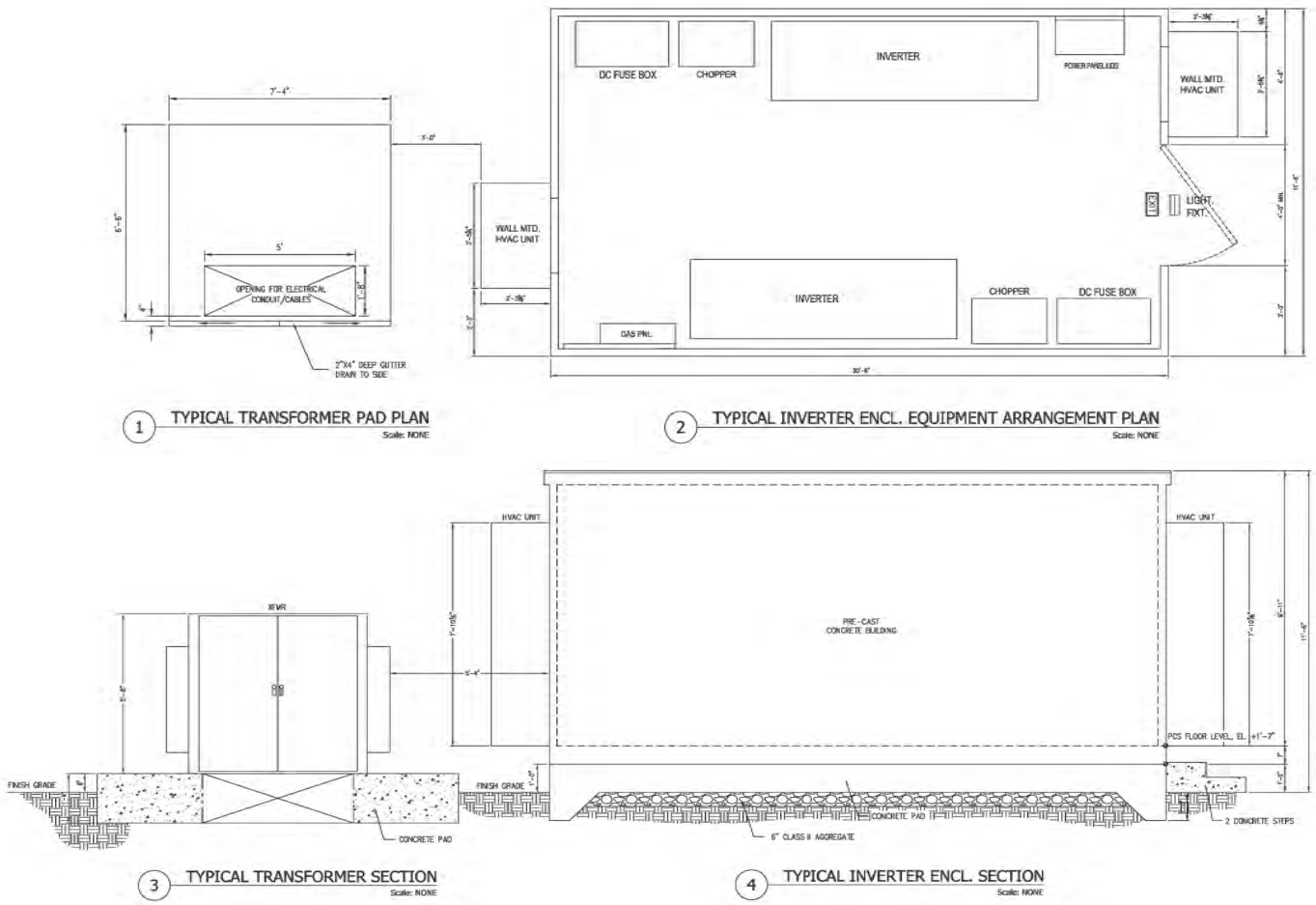
SOURCE: San Luis Obispo County 2010a

PV modules would be organized into up to 460 arrays. One typical array configuration would cover approximately seven acres and would generate 1.3 megawatts of AC current.

Potential PV Array Schematic

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-5



SOURCE: San Luis Obispo County 2010a

Typical PV arrays would include two inverters housed in an enclosure and one transformer. The inverters would convert the DC electric input into AC electric output, and the transformer would step up the current to 34.5 kV.

Typical Power Conversion Station Schematic

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-6

Typical Transformer

The PVCS would collect the power from between four and thirty arrays, depending upon the final site layout, for transmission to the Project substation. The switchgear cabinets, depicted below, would be approximately 12 feet high and would be situated on concrete pads dispersed among the arrays.

Typical PV Combining Switchgear Cabinet

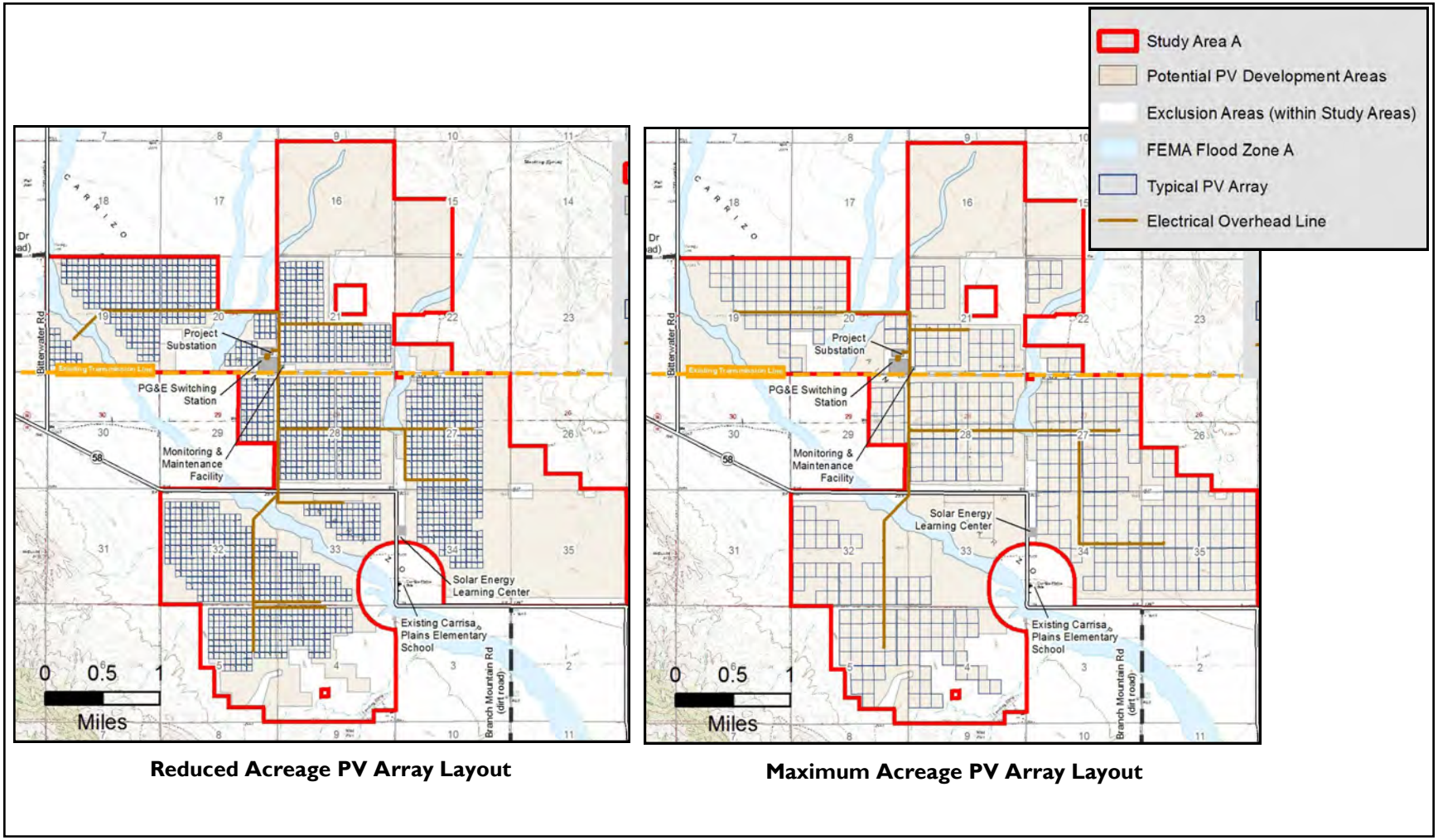
Overhead 34.5-kV high-capacity collection system lines, with two to four circuits each, would connect the power output from the PV switchgear to the Project substation. Wooden poles approximately 43 feet high would support these overhead lines. Alternative A would contain approximately 12 miles of high-capacity collection system lines, while Alternative B would contain approximately 8 miles of lines. **Figure 2-7**, Potential Site Layouts—Alternative A, shows potential on-site electrical line layouts for Alternative A, while **Figure 2-8**, Potential Site Layout—Alternative B, shows a potential on-site electrical line layout for Alternative B. The on-site electrical collection system would be designed to minimize electrical losses within the Project Site prior to delivery to the Project substation.

A meteorological station would be installed on the Project Site to track weather patterns. The meteorological station would include a supervisory control and data acquisition (SCADA) system to collect data for analysis and system monitoring. The SCADA system involves a network of data loggers and programmable logic controllers at each PCS enclosure. These would in turn be connected to a Wide Area Network and monitored on-site at the monitoring and maintenance facility, described in Section 2.3.2, as well as at a remote Network Operations Center.

Project Substation

The Project substation would collect the output of the Project's medium-voltage collection system and transform it from 34.5 kV to 230 kV. The substation would occupy approximately 4.5 acres and would be adjacent to the PG&E switching station, where the 230-kV output of the substation would be connected and delivered to the Morro Bay to Midway 230-kV transmission line.

The substation site would be graded and compacted to an approximately level grade. Several cement pads with footers would be constructed as foundations for the transformers and other electrical equipment, and the remaining area inside of the substation fence would be graveled. All of the approximately 20 medium voltage (34.5-kV) overhead collection system lines will be fed into the substation and tie into a common bus. The common bus collects all the 34.5-kV power and connects to the low side of the power transformers. The high side of the transformers will tie into the adjacent PG&E switching station. The substation will contain line termination structures, high-voltage switchgear, power transformers, low-voltage switchgear, disconnect switches, and protection and control equipment. There will also be trenching within the substation for the ground grid installation, buried duct banks for power cables and control cables. In addition, an eight-foot-high chain link fence would be constructed around the substation and will be properly grounded for personnel protection.

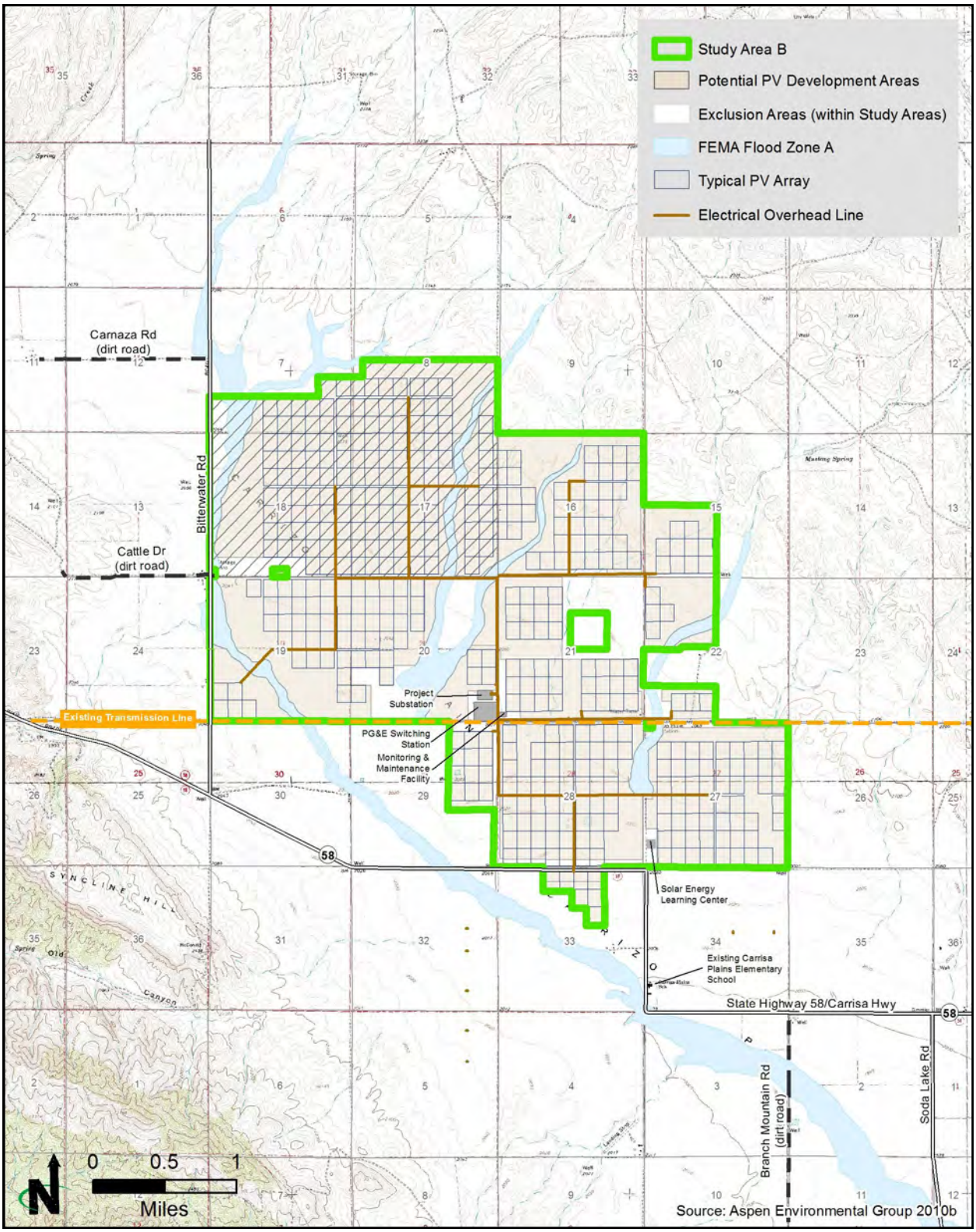


The potential on-site layout under Alternative A would cover between 3,400 acres and 4,100 acres. The reduced acreage PV array layout would avoid more grassland areas.

Potential Site Layouts—Alternative A

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-7



The potential on-site layout under Alternative B would develop up to 4,000 acres. This layout would include development of lands under Williamson Act contract.

Potential Site Layout-Alternative B

Topaz Solar Farm
San Luis Obispo County, CA

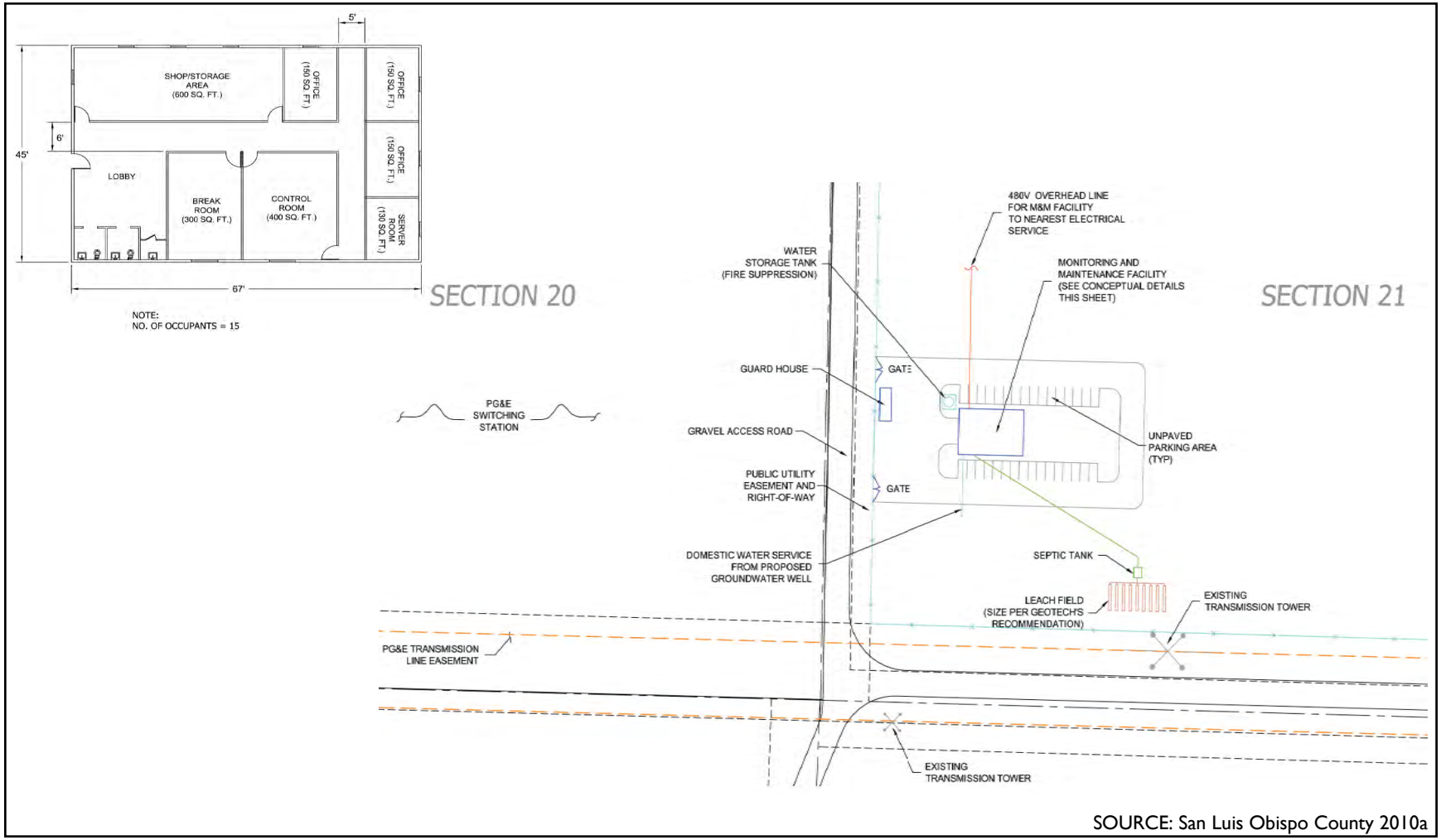
Figure 2-8

Monitoring and Maintenance Facility

An 11,250-square-foot monitoring and maintenance facility would be constructed near the Project substation. **Figure 2-9**, Monitoring and Maintenance Facility, provides a conceptual drawing of the facility. This facility would be used for parts storage, security, and project monitoring. A specific design for the facility has not been selected, but it is anticipated to be a prefabricated building such as the one depicted below. The design would be compliant with the Americans with Disabilities Act (ADA). The building would be located on a graded area with adjacent worker parking. Foundations for the monitoring and maintenance facility building would be concrete slab.

Potential Monitoring and Maintenance Facility

Based on the results of preliminary percolation tests, a leach field and septic system would be sited adjacent to the facility to serve on-site sewage disposal needs. Permanent water storage tanks would be installed at a well or wells near the proposed monitoring and maintenance facility and Solar Energy Learning Center (described below). These permanent tanks would be sized to meet the expected daily water demand of approximately 4,015 gallons. These tanks would be available to local fire protection services for emergency use. If deemed necessary, an on-site water treatment system would be installed.



SOURCE: San Luis Obispo County 2010a

An 11,250-square-foot monitoring and maintenance facility would be constructed near the Project substation. The location of the facility, which would be the same under both alternatives, is depicted on Figures 2-2 and 2-3.

Monitoring and Maintenance Facility

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-9

Solar Energy Learning Center

As part of the Proposed Project, the Project Proponent would construct and operate a Solar Energy Learning Center within the Project Site boundary. The Project Proponent would work with local educators to develop exhibits, tours, and educational programs for the center that would complement existing science and sustainability curricula. The center would be able to accommodate several class field trips per day, as well as 100 to 200 visitors per month. The center would be advertised to local school districts, community colleges, and universities and would include exhibits and information on solar power designed for both students and the general public.

The center would be an ADA-compliant, 30-foot-by-30-foot enclosed building with restrooms, a scale model of the solar facilities, and exhibits on solar power. The building would have stairs to an observation deck on the roof that would allow visitors a vista of the nearby PV arrays. The center would be approximately 15 feet high with a safety railing around the roof deck, which would add an additional 5 feet in height to the building for a total height of 20 feet. The final location and design for the center would be determined before construction through discussions between the Project Proponent, San Luis Obispo County, and local educators.

Fencing

The Project Site would be fenced with a six-foot-high chain link fence topped with three strands of barbed wire. Perimeter fencing would have small openings (approximately twelve inches in height by four to six inches in width) at the base of the fence approximately every 100 yards, totaling over 600 ground-level openings around the entire Project Site, to allow kit fox passage through the PV arrays. Gated eight-foot-high chain link fences would be constructed around the substation, the switching station, and the construction staging areas. Perimeter and other proposed fencings would serve to restrict public access and limit public liability, as required by County Municipal Code § 22.32.060(A)(2) and the National Electrical Safety Code (Section III, Article 110.31).

Drainage Improvements

Both study areas include ephemeral drainages, which are subject to USACE jurisdiction under Section 404 of the CWA (referred to herein as jurisdictional drainages). Most of the ephemeral drainages that extend across the Project Site are historically interconnected and flow during significant rainfall events towards the main drainage, which drains to Soda Lake, a shallow, ephemeral alkali lake in the Carrizo Plain National Monument approximately 10 miles southeast of the point where the main drainage leaves the Project Site. Study Area A contains 31 ephemeral drainages, totaling 15 acres over 67,437 linear feet. Study Area B includes 12 ephemeral drainages, totaling 10 acres over 37,743 linear feet. These drainages have been denuded and modified by past farming activities.

Other than permitted "fill" locations for placement of PV module support posts, road crossings, trenching, poles for overhead collection system lines, fence posts, and restoration work, the Proposed Project would avoid direct earthmoving and fill placement impacts on the federal jurisdictional drainages in Study Area A and Study Area B. Given the linear nature of the ephemeral drainages throughout the Project Site, impacts on these Other Waters of the US were found to be unavoidable in designing the project layout.

The existing farm access dirt roads within the study areas travel directly through low swales. Jurisdictional crossings would include the installation of at-grade articulated concrete blanket crossings designed to match the contours of the existing drainage and designed to ensure that the volume, velocity, quantity of storm water runoff, and up- and down-slope drainage configuration would be maintained within the historical range of conditions. The historical water levels would be derived from the hydrologic and topographic studies prepared for this Project. In addition, these studies determined boundaries of the 100-year flood zones, and these were considered in the Proposed Project design to ensure the Project would maintain existing watershed and hydraulic conditions. Specific storm water control measures would be outlined in the Storm Water Pollution Prevention Plan (SWPPP) for construction activities.

The Project Proponent would compensate for the loss of jurisdictional ephemeral drainage habitat through in-kind habitat restoration of a portion of the main drainage at a minimum ration of 2:1. This will result in reestablishing impacted ephemeral drainages by rebuilding a former portion of an aquatic resource (i.e., the main drainage), resulting in a gain in aquatic resource area and functions. The reestablished drainage area will be vegetated with native vegetation typical of drainages in the project area. The reestablished habitat will provide improved functions compared to those of the impacted drainages. Implementing compensatory mitigation in the main drainage will expand its flood storage and desynchronization functions and will reduce flood damage by attenuating floodwaters following significant precipitation events. The main drainage will be protected from surrounding upland land use activities by an average 100-foot upland buffer. The mitigation area and buffer will be protected from future development by a recorded conservation easement, and a non-wasting endowment fund will be established for long-term land management.

Buffer Zones

The minimum project buffer zone would be 50 feet between PV arrays and public roads and adjacent property lines. The Proposed Project would also include a buffer zone of 50 feet from the centerline of the main drainage. **Table 2-2**, Project Buffer Zones, presents the buffer zone distances from public roads and residential properties that are proposed by the Project Proponent for each of the project-specific alternatives.

TABLE 2-2
PROJECT BUFFER ZONES

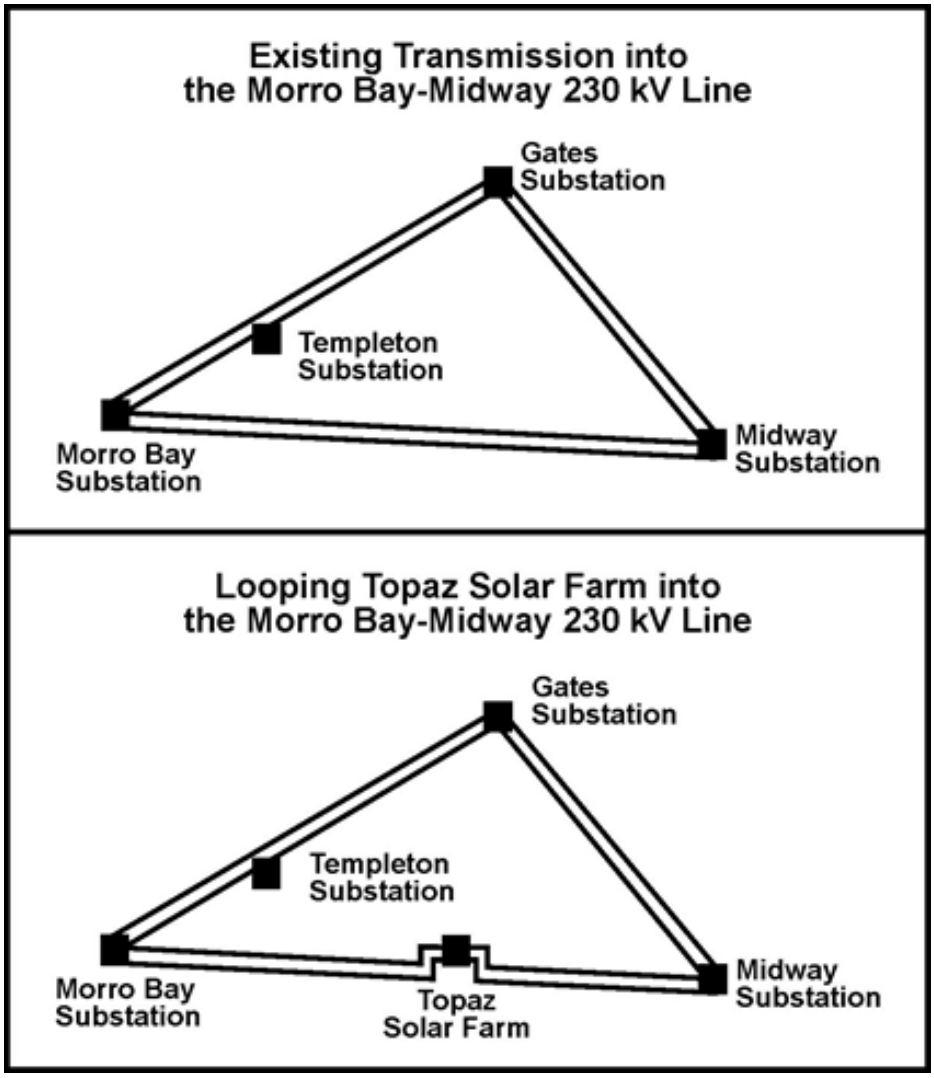
LOCATION	BUFFER ZONE WIDTH (FEET)
Right-of-Way and/or Property Line Setback – Site Layout Alternative A	
Sec 28, from edge of Highway 58 right-of-way	min. 400
Sec 32, from edge of Highway 58 right-of-way	min. 400
Sec 34, from eastern edge of Highway 58 right-of-way	min. 400
Sec 34, from northern edge of Highway 58 right-of-way	min. 400
Sec 35, from edge of Highway 58 right-of-way	min. 400
Sec 21, from northern boundary of 40-acre residential parcel	1,613
Sec 21, from southern boundary of 40-acre residential parcel in Sec 21	370
Sec 21, from western boundary of 40-acre residential parcel in Sec 21	306
Sec 21, from eastern boundary of 40-acre residential parcel	1,434
Sec 21, from western boundary of 40-acre residential parcel in Sec 22	202
Sec 22, from northern boundary of 40-acre residential parcel in Sec 22	644
Sec 22, from southern boundary of 40-acre residential parcel in Sec 22	570
Sec 19, from eastern edge of Bitterwater Road right-of-way	113
Right-of-Way and/or Property Line Setback – Site Layout Alternative B	
Sec 34, from eastern boundary of school	2,141
Sec 21, from northern boundary of 40-acre residential parcel	1,613
Sec 21, from southern boundary of 40-acre residential parcel in Sec 21	370
Sec 21, from western boundary of 40-acre residential parcel in Sec 21	306
Sec 21, from eastern boundary of 40-acre residential parcel	1,434
Sec 28, from northern edge of Highway 58 right-of-way	min. 400
Sec 33, from southern edge of Highway 58 right-of-way	min. 400
Sec 22, from northern boundary of 40-acre residential parcel in Sec 22	394
Sec 21, from western boundary of 40-acre residential parcel in Sec 22	202
Sec 22, from southern boundary of 40-acre residential parcel in Sec 22	291
Sec 19, from southern boundary of residential fence line in Sec 18	119
Sec 19, from eastern edge of Bitterwater Road right-of-way	113

2.3.3 PG&E Transmission System

The PG&E transmission system would deliver power generated by the Proposed Project to PG&E's retail customers. The final design of the transmission system would be completed by PG&E, which would own and operate the transmission facilities described below. The Project substation, described in Section 2.3.2, above, would be owned by the Project Proponent.

Interconnection to Transmission Grid

Electricity generated by the Proposed Project would be delivered to PG&E's high-voltage transmission grid by looping the two circuits of the Morro Bay to Midway 230-kV transmission line into the new PG&E switching station (**Figure 2-10**, Connection to Existing Transmission System). To interconnect the



SOURCE: San Luis Obispo County 2010a

Electricity generated by the Topaz Solar Farm would be delivered to PG&E's high-voltage transmission grid by looping the two circuits of the Morro Bay to Midway 230-kV transmission line into the new PG&E switching station.

Connection to Existing Transmission System

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-10

Proposed Project, both circuits would be looped from the transmission corridor into the new PG&E switching station adjacent to the transmission corridor and then back to the transmission corridor. The loop lines would be approximately 200 to 400 feet in length. Four new circuits would be constructed between the existing transmission corridor and the new switching station (two in and two out of the switching station), with two circuits per tower line.

PG&E Switching Station

The Project switching station would be constructed adjacent to the existing PG&E Morro Bay to Midway 230-kV transmission line, just south of the Project substation. Although the PG&E switching station is included within the scope of this EIS, it will be constructed and operated by PG&E. The Proposed Project would be interconnected to the PG&E transmission line using a three-bay, six-position breaker and a half configuration. Two positions of this switching station would be used to connect the output from the Proposed Project to the PG&E switching station, and the remaining four positions would be used to loop the PG&E line through the switching station.

The switching station would be approximately 600 feet by 650 feet (9 acres) and would be enclosed by a fence separate from the adjacent Proposed Project substation. The switching station would require additional area for the incoming and existing transmission line. Estimated dimensions for the switching station with the transmission line are 880 feet by 715 feet (about 14.5 acres). Two new 100- to 125-foot-high double-circuit lattice steel transmission towers and four steel poles would be installed within or adjacent to PG&E's transmission line right-of-way to accommodate the looping of the 230-kV line into the switching station. The towers and poles would be situated on either side of the new switching station to position the transmission conductors for proper ingress and egress to the station. The switching station would include an approximately 175-foot-tall microwave tower. The tower would be a self-supported unpainted lattice steel structure. Construction of the switching station and transmission towers is described below.

Construction and Configuration of Interconnection Facilities

Construction of the interconnection between the existing Morro Bay to Midway 230-kV transmission line and the new PG&E switching station would be undertaken by PG&E. Construction of the transmission facilities would be scheduled to occur after the PG&E switching station has been completed to allow each transmission circuit to be placed back in service immediately after it is interconnected to the new switching station. Construction of the loop lines would include disturbance at locations where excavation for tower and pole locations would occur and where towers and poles would be installed. Wheeled vehicles for transportation of conductor spools, and line-pulling and tensioning equipment would traverse the transmission line construction area.

Structures

Two new 100- to 125-foot-high double-circuit lattice steel transmission towers and four steel poles would be installed to accommodate the looping of PG&E's 230-kV transmission line into the switching station. **Figure 2-11**, Proposed Transmission Tower Design, shows the preliminary design. The two lattice structures would likely be located within or adjacent to the existing PG&E transmission line right-of-way. The four steel poles would be located on either side of the new PG&E switching station to position the transmission conductors for proper ingress and egress to the station. Additional structures would be installed for the connections from the 34.5/230-kV transformers to the PG&E switching station. These structures would be located within the switching station and substation or within the buffer area adjacent to the switching station. The PG&E switching station would contain nine 230-kV gas-insulated circuit breakers. Three additional 230-kV gas-insulated circuit breakers would be installed in the Project substation.

The foundations for the transmission line structures would consist of single concrete piers reinforced as necessary to withstand design loads. These would be formed by augering a hole of appropriate diameter and depth, placing a cage of reinforcing steel in the augered hole, and filling the hole with high-strength concrete to the appropriate elevation. Single-circuit tower structures may be direct-buried rather than installed on foundations.

Conductors

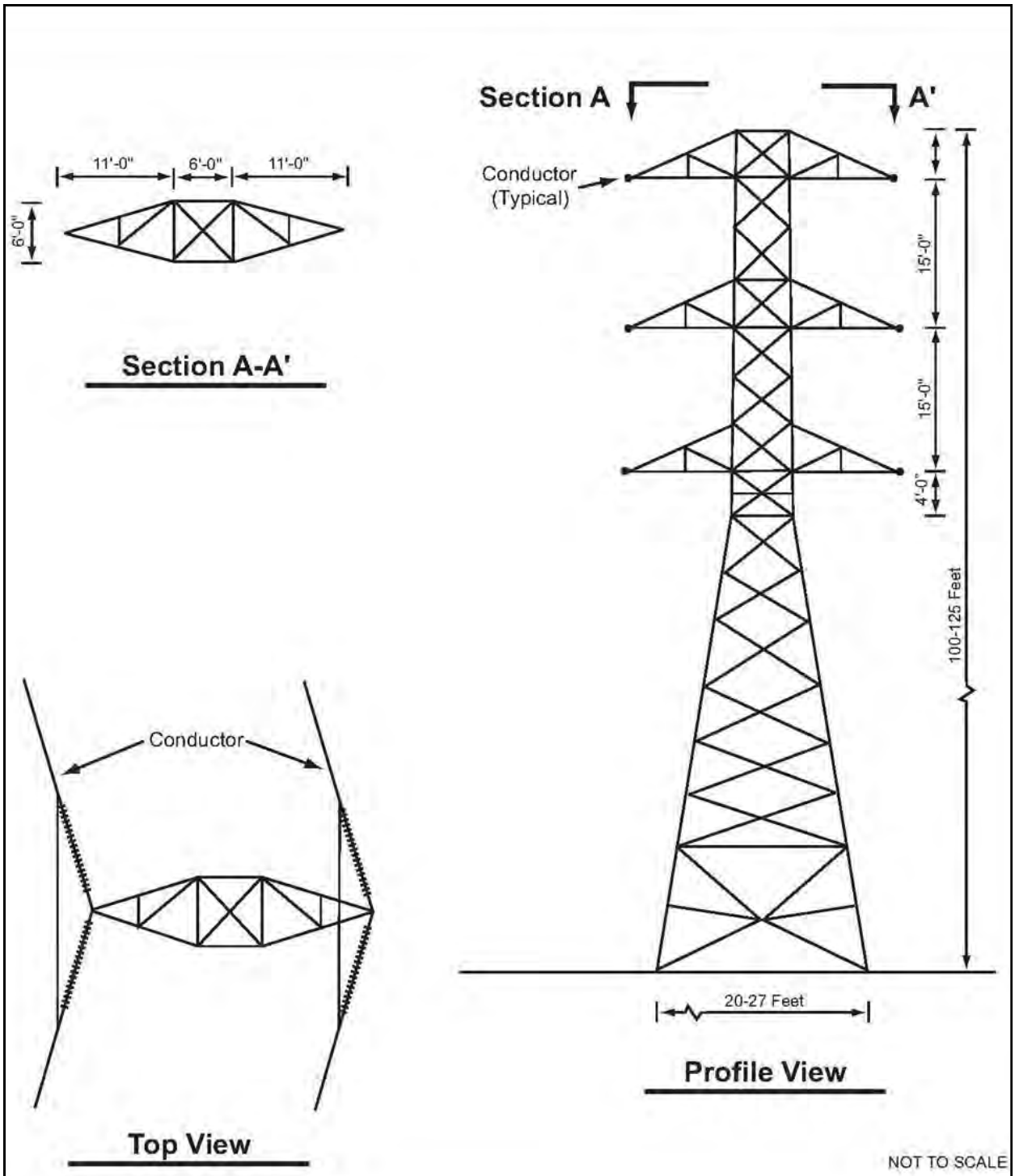
The selection of conductor for looping PG&E's 230-kV line into the PG&E switching station would be based on both matching the rating of the existing circuits and additional capacity to accommodate future improvement of these lines. The existing transmission line is strung with 1,113 MCM all-aluminum conductors. The new conductors would be of equal or higher capacity.

Foundations

Foundations for the transmission line structures would consist of single concrete piers reinforced as necessary to withstand design loads. These would be formed by augering a hole of appropriate depth and diameter, placing a cage of reinforcing steel in the hole, and filling the hole with high-strength concrete. Single-circuit tower structures may be direct buried rather than installed in foundations.

Transmission System Upgrades Beyond Point of First Interconnection

PG&E and the CAISO have completed interconnection studies for the first 400 MW of project capacity. These studies confirmed that at least this capacity produced by the Proposed Project would be deliverable via the existing transmission line. The work beyond the interconnection switching station would involve telecommunications and controls work within existing PG&E facilities to interconnect this 400 MW.



*Preliminary and subject to change based on CPUC requirements, final engineering, and other factors.

SOURCE: San Luis Obispo County 2010a

Two new 100- to 125-foot-high double-circuit lattice steel transmission towers and four steel poles would be installed to accommodate the looping of PG&E's 230 -kV transmission line into the switching station.

Proposed Transmission Tower Design

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-11

For the final 150 MW of proposed project capacity, CAISO determined that network upgrades were required to accommodate the interconnection of a group of generation projects in the region, including the Project's remaining 150 MW. This upgrade would include the reconductoring of the 230-kV transmission line between the Project switching station and the Midway Substation and is described in detail in Section 2.4, Connected Action.

2.3.4 Proposed Project Construction

Construction of the Proposed Project would begin in 2011 in accordance with DOE loan guarantee program requirements and would take approximately three years to complete. The switching station construction by PG&E would also begin in 2011 to allow the Proposed Project to be interconnected to the transmission lines as portions of the facility come online.

The construction workforce would average 400 workers, with a peak of approximately 500 workers. The construction workforce would be recruited from within San Luis Obispo County to the extent practicable. Typical construction work schedules are expected to be from 7:00 AM to 5:00 PM, Monday through Friday. Any work outside these hours would comply with County standards for construction noise levels. Selected tasks would be performed after dark when there is no solar resource and no energy being produced; task-specific lighting would be used during these times. In addition, 24-hour on-site security would be provided.

A safety and compliance director employed by the Project Proponent and assigned to the Proposed Project would ensure that construction activities follow all Occupational Safety and Health Administration (OSHA) and California Division of Occupational Safety and Health Administration (CalOSHA) requirements. A site-specific Health and Safety Plan would be developed, identifying roles and responsibilities of every employee with respect to project safety.

Specific construction activities are described below, followed by environmental protection measures incorporated into the Proposed Project to avoid or reduce construction-related impacts.

Construction Staging

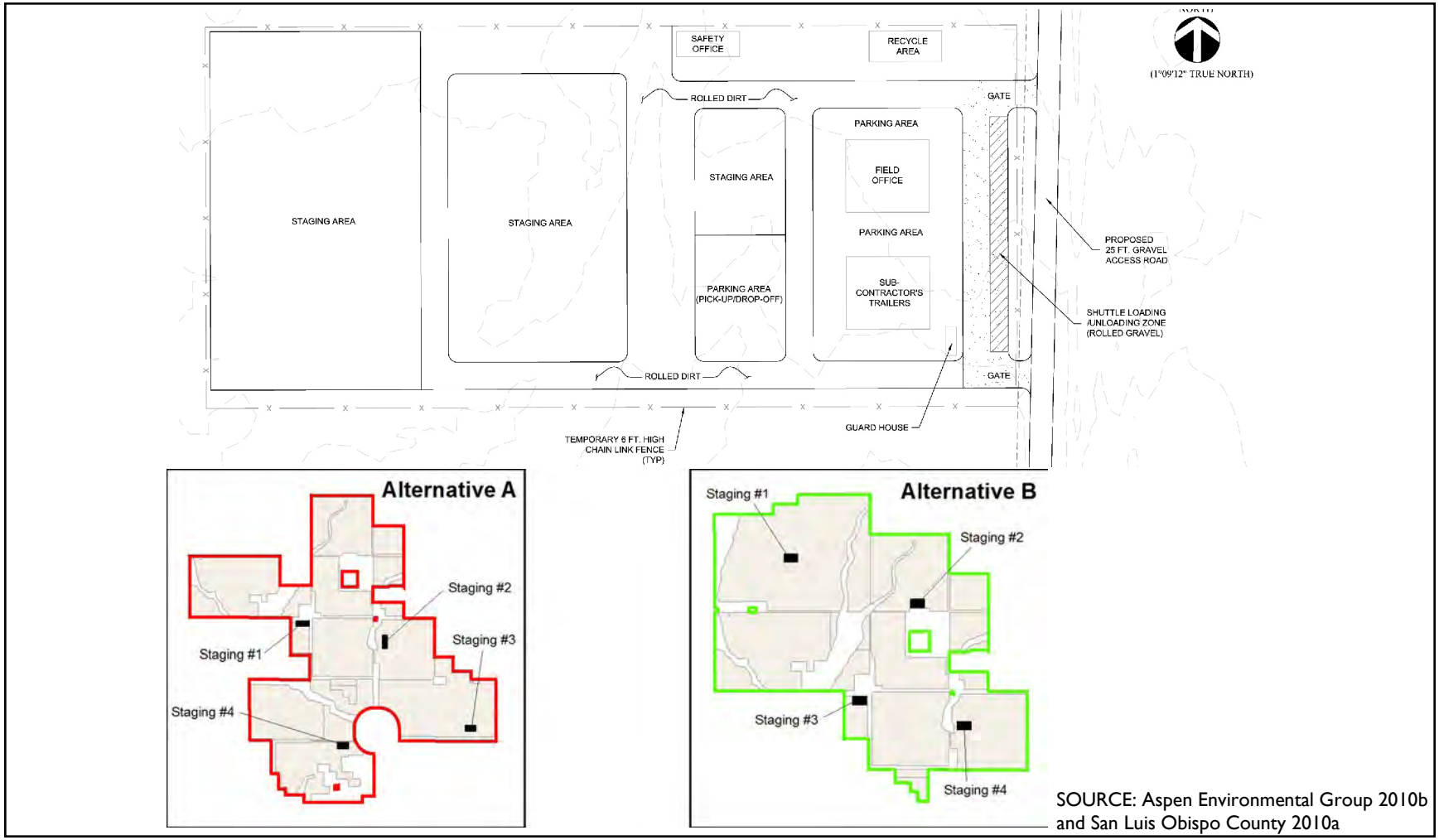
Prior to the start of site preparation activities, four 10-acre construction staging areas would be developed; these areas would be fenced for security. The staging areas would include construction offices, a first aid station, worker parking, truck and shuttle loading and unloading areas, and laydown areas. Temporary portable toilet facilities, bottled water, and wells would serve the sanitary needs during the construction process. There would also be up to four separate parking areas of approximately five acres each located adjacent to construction access roads. The parking areas would be located near project entrances to minimize the distance traveled within the site upon arrival. These temporary staging areas and parking areas would be located as needed to support

construction efforts, and may be moved during the construction process. There would be no more than four construction staging areas and four parking areas at any given time. The staging and parking areas would be decommissioned upon completion of construction. If they are located in areas proposed for PV arrays, these components would be installed in their place. **Figure 2-12**, Possible Staging Area Locations, shows the general layout and typical locations of the construction staging areas under each alternative.

Site Preparation

Site preparation would involve improving existing on-site construction access roads or constructing new roads utilizing gravel or other road stabilization material if appropriate, installing drainage crossings, setting up construction staging areas, performing storm water management work, preparing land areas for array installation, and other activities needed before installation of the PV arrays can begin. Work would include trimming vegetation, agricultural smoothing and rolling of PV array areas, selected compacting and grading, and setting up modular offices and other needed facilities. Site preparation would be phased in 2- to 20-MW blocks to minimize ground disturbance. Initial activities include clearing and fencing of the substation location and adjacent switching station area. The four temporary construction staging areas described above would then be cleared and fenced, and the construction entrances would be improved. One existing occupied residence and two existing unoccupied residences within Study Area A, and two existing occupied residences and one existing unoccupied residences within Study Area B would be acquired by the Project Proponent. These residences would either be demolished or utilized as temporary facilities. In the event that any structure is demolished, all required permits would be secured, and all demolition materials would be recycled or disposed in a licensed landfill. In addition, there are two occupied residences surrounded by Study Area A and one occupied residence immediately north of the PV modules in Study Area A that are expected to remain during project construction and operation. There are two occupied residences surrounded by Study Area B that are expected to remain. Project components have been set back from these residences as indicated in Table 2-2, Project Buffer Zones.

The PV arrays require a relatively level and stable surface for safe and effective installation. Topographic, geotechnical, and hydrologic studies were used to determine the necessary grading and compaction. On the majority of the Project Site, the ground under the PV arrays would not require grading. The existing vegetation would remain and would be trimmed as close to the ground as possible by mowing or grazing. Next, an agricultural tool, such as a harrow or cultipacker, would be used to loosen and smooth the top one to three inches of soil. Finally, a smooth steel drum roller, or similar equipment, would be used to bring the top four to six inches of soil to a compaction value of approximately 80 percent (the existing soil at the Project Site ranges from 61 to 77 percent).



SOURCE: Aspen Environmental Group 2010b and San Luis Obispo County 2010a

Temporary staging areas would be located as needed to support construction efforts.

Possible Staging Area Locations

Topaz Solar Farm
San Luis Obispo County, CA

Figure 2-12

Beneath the compacted surface of the soil, the soil would remain at the existing level of compaction, allowing small mammal dens and burrows to remain. Depending on the moisture level of the soil at the beginning of construction, some water may need to be added during construction to control dust, or added one to two days before construction to assist in compaction.

A small portion of the Project Site has slopes that are too steep to accommodate PV arrays. Excessive slopes would be graded and reduced to no greater than three percent grade. In order to accomplish this slope level, two different grading methodologies would be implemented, including continuous nominal grading and pocket grading. Grading would maintain watershed features, allowing drainages to enter and exit the Project Site in historic locations and meander through the site on a natural course.

In addition to the slope-related grading described above, grading and compacting is proposed for the construction staging areas, the transformer and inverter enclosures, the Project substation and PG&E switching station, the access roads, the Solar Energy Learning Center, and the monitoring and maintenance facility. Approximately 22 miles (of on-site construction access roads utilizing existing agricultural roads to the extent feasible are expected to be required. These roads would be widened to 25 feet, compacted to 90 percent, and treated with gravel or other road stabilization material. This treatment of dirt roads would reduce the need to use water to control dust on roads during construction.

Trenching would occur within each array to bury the electrical cables. The trenches would be approximately two feet wide and four feet deep, and each array would have approximately 2,000 to 2,500 linear feet of trenches, depending on the array's proximity to the PVCS. Minimal ground disturbance may occur within the trenched corridors to restore them after soil has been replaced in the trenches, so that the corridor can conform to the existing surface contours.

Facility Construction and Installation

The facility construction and installation phase involves installing the PV solar arrays and all the necessary electrical equipment to make the Proposed Project operational. In addition, preparation of the ground under the arrays and improvement of the construction access roads would continue throughout the majority of the installation process.

For array installation, vertical support posts are first driven into the ground. These would hold the tables on which the PV modules would be mounted. Trenches would be dug for the AC and DC cabling, and the foundations for the inverter enclosures and transformers would be prepared. While cables are being laid and combiner boxes are being installed, the PV tables would be erected. Prefabricated tilt brackets attach steel structure tables to the vertical posts. Brackets attach the PV modules to the tables. Wire harnesses would connect the PV modules to the electrical collection system. Underground cables

and overhead circuits would connect the PCSs to the on-site AC electric infrastructure and ultimately to the Project substation.

A separate crew is expected to build the Project substation and the connection to the existing transmission line in the PG&E switching station. During the final system validation and commissioning process, the SCADA and monitoring systems would be brought online, the equipment would be tested, and operational readiness would be verified. The Proposed Project would be brought online and connected to the grid in phases as each subsequent 2- to 20-MW block is completed.

Site Access and Transportation

Traffic during construction would be from workers commuting to and from the site and from the delivery of components and equipment to the Project Site. The Project Proponent's proposed main access to the Project Site for construction vehicles and delivery trucks is from Interstate 5 via Highway 58 westbound. This route was selected to maximize safety and minimize congestion. A truck management plan has been developed to address traffic-related issues.

Shuttle buses would be used to transport workers to the Project Site from designated lots in the nearby towns. Each bus would transport approximately 20 workers to the site via either Highway 58, or Highways 41 and 46 and Bitterwater Road, depending on the pickup location. The majority of the craft labor construction workers would be required to report to shuttle pick-up locations at the beginning of their shift. Requiring employee use of the shuttles would ensure that the majority of the workforce would not drive personal vehicles to the Project Site. Employees who live in communities that are closer to the Project Site than to the shuttle pick-up locations, such as California Valley, may be allowed to drive personal vehicles to the construction site. In addition, management-level employees and specialized employees working unique shifts would need to commute via personal vehicles. Parking would be limited on site to accommodate only those employees that live nearby and those management-level and specialized employees not taking the shuttles. It is expected that there would be 55 employees commuting via personal vehicles per day on average and 85 employees commuting via personal vehicles per day at peak. In addition, visitors to the site would be accommodated by a visitor parking area. Estimated daily trips during construction are shown in **Table 2-3**, Estimated Construction Traffic.

TABLE 2-3
ESTIMATED CONSTRUCTION TRAFFIC

PURPOSE	AVERAGE DAILY ROUNDTRIPS[1]	PEAK DAILY ROUND-TRIPS[2]
Employee Trips	78	114
Trucks Delivering Road Aggregate (25-ton trucks)	3.5 (Alternative A) 6.7 (Alternative B)	40
Total Roundtrips Not Subject to Topaz Truck Management Plan	81.5 (Alternative A) 84.7 (Alternative B)	154
On-Road Construction Vehicles	<1	
Off-Road Construction Vehicles & Equipment	<1	
Deliveries (Including PV modules and other construction materials)	20	
Substation and Switching Station Equipment Deliveries (approx. 20 total deliveries)	<1	
Total Roundtrips Subject to Topaz Truck Management Plan	<23	35
Total	104.5 (Alternative A) 107.7 (Alternative B)	189

[1]Assumes a 36-month construction period with active deliveries occurring for 30 months. Total expected truck trips were divided over the 30-month active delivery period.
[2]Assumes 500-person peak period workforce.
[3]Trucks would deliver aggregate during road construction at the start of the Project; these truck trips would not occur throughout the length of construction.

The trucks would use the system of on-site construction access roads, improved with gravel or other road stabilization material, to deliver their goods near the current stage of construction. An estimated 40,000 cubic yards of aggregate for Alternative A and 75,000 cubic yards of aggregate for Alternative B would be imported during the site preparation period to improve the construction access roads. If gravel is selected as the road stabilization material, it is expected to be supplied by nearby mines (subject to availability), including the Navajo Creek mine, located approximately 10 miles west of the Project Site, and the Twisselman surface mine being permitted with the California Valley Solar Ranch (CVSR) project, located approximately five miles east of the site.

An estimated 238 construction vehicles would be brought to the Project Site at the beginning of the construction process and would remain on site throughout construction. These vehicles would generally not be used on public roads; rather, they would be stored on-site while not in use. **Table 2-4**, Construction Equipment and Vehicles Located and Stored On Site, lists the type and number of construction vehicles expected to be in use during the approximately three-year construction period. When construction begins, the most appropriate equipment available would be identified and used. A Construction Activity Management Plan would be prepared based on the actual construction fleet and would be submitted to the San Luis Obispo County Air Pollution Control District (APCD) for review and approval prior to the start of construction.

TABLE 2-4
CONSTRUCTION EQUIPMENT AND VEHICLES LOCATED AND STORED ON SITE

QUANTITY	EQUIPMENT	PURPOSE	DURATION (MONTHS)	TRANSPORTATION TO PROJECT SITE	APPROXIMATE HORSEPOWER
SITE PREPARATION AND CLEARING/LEVELING					
4	Water Truck	Dust Control/ Compaction	30	Self Transport	189
4	Graders	Road/Staging Prep	15	Delivered (1 per Flatbed Truck)	174
4	Paddle Scrapers	Road/Staging Prep	15	Delivered (1 per Flatbed Truck)	313
4	Rollers	Road/Staging Prep	15	Delivered (1 per Flatbed Truck)	95
4	Farm Roller	Field Preparation	15	Delivered (1 per Flatbed Truck)	95
UNDERGROUND WORK (BORING, TRENCHING, INSTALLING CONDUIT)					
20	Small Backhoe	Excavation/ Backfill	20	Delivered (1 per Flatbed Truck)	108
32	Small Sheepsfoot Roller	Compaction	20	Delivered (1 per Flatbed Truck)	95
20	5 CY Dump Truck	Excavation/ Backfill	20	Self Transport	
SYSTEM INSTALLATION					
32	4x4 Forklift	Material Staging	30	Delivered (1 per Flatbed Truck)	100
64	ATV Vehicles (such as Gator)	Material Staging/ Transportation	30	Delivered (4 per Flatbed Truck)	30
10	Truck-Mounted Pile Driver	Post Installation	27	Self Transport	40
40	Pick-up Trucks	Material Staging/ Transportation	30	Self Transport	--

Water Consumption

During the three-year construction period, water would be needed for site preparation, compaction of building pads, road preparation, and dust control. In calculating the water requirements, the Project Proponent considered the local soil conditions and allowed for the possibility that three consecutive dry (low rainfall) years would occur during the Project's three-year construction period. **Table 2-5**, Water Demand During Construction, shows the water-demand requirements during project construction. As shown in this table, Alternative B would require more water for soil preparation and dust mitigation than Alternative A because of Alternative B's larger grading requirement due to rougher existing topography.

TABLE 2-5
WATER DEMAND DURING CONSTRUCTION

	DAILY DEMAND (GALLONS PER DAY)		ANNUAL DEMAND (ACRE-FEET/YEAR)		
	AVERAGE	PEAK	YEAR 1	YEAR 2	YEAR 3
Alternative A	170,500	550,000	191	191	48
Alternative B	243,700	810,000	273	273	69

One temporary dust mitigation water storage basin may be located within each area under construction, and up to five water storage basins may be operational at any given time. These would provide water trucks with the necessary access to sufficient water for dust mitigation. The basins would be lined with polyvinyl chloride (PVC), and would be 80 feet by 80 feet in surface area. The basins would be removed and the ground restored after construction is complete in each portion of the Project Site.

There are several existing wells on the Project Site that have historically produced 40 gallons per minute or more. Subject to well analysis, the Proposed Project would use two existing wells, one capped well, and two new wells during construction. Pumps would be installed within each well to provide sufficient water for dust control.

The well pumps would be activated as frequently as necessary to keep the basins filled, up to 24 hours per day. Well pumps would be turned off once it is determined that water is no longer needed in a basin, and any remaining water in the basin would be distributed across the surface of the site, primarily on roadways to control dust.

Lighting

The Project Proponent will use temporary, shielded, portable, task-specific lights as needed, particularly in the construction staging areas. There would be no lights around the project perimeter during the construction phase.

Erosion Control Measures

The Project Proponent is conducting a vegetation site test to study various approaches to prevent soil erosion and provide dust control on the Project Site during construction. The results of this testing have been used in the preparation of the Draft Vegetation Management Plan for the Project (Althouse and Meade 2011). Throughout the site preparation and construction periods, appropriate erosion control measures would be implemented during the rainy season. These measures would include silt fences for erosion control along the downstream edge of groups of arrays and fiber rolls along roads and easements. The Project Proponent would obtain a National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (General Permit) Water Quality Order 99-08-DWQ. As part of expected obligations under the General Permit, the Project Proponent

would prepare and implement a construction SWPPP prior to the commencement of soil-disturbing construction activities.

Hazardous Materials

Small quantities of hazardous materials would be stored on the Project Site during construction; these are listed in **Table 2-6**, Hazardous Materials Stored On Site During Construction. During construction these materials would be stored in an enclosed and secured location such as portable outdoor hazardous materials storage tanks or cabinets equipped with secondary containment to prevent contact with rainwater. The hazardous materials storage would not be located immediately adjacent to any drainages. The portable hazardous materials storage facilities may be moved with each area of development, as deemed necessary.

TABLE 2-6
HAZARDOUS MATERIALS STORED ON SITE DURING CONSTRUCTION

PRODUCT	USE	AMOUNT STORED ON SITE DURING CONSTRUCTION
Diesel Fuel	Vehicles	5,000 gallons
Gasoline Fuel	Vehicles	5,000 gallons
30W Motor Oil	Vehicles	100 quarts

A site-specific spill response plan would be developed prior to construction and operation and would require that personnel be made aware of procedures for spill cleanup and procedures to report a spill. Large quantities of hazardous materials would not be used or stored on-site during construction or operation of the Proposed Project. Spill cleanup materials and equipment appropriate to the type and quantity of hazardous materials expected would be located on-site, and personnel would be made aware of their location. Key employees would be trained in spill response procedures. Spill response materials would include, but would not be limited to, brooms, dust pans, mops, rags, gloves, absorbent pads/pillows/socks, sand/absorbent litter, sawdust, and plastic and metal containers.

Best management practices (BMPs) would be used to reduce the risk of spills and other accidental exposure to hazardous materials and waste during construction and operation. Hazardous material storage would not occur adjacent to any drainages, and excess materials would be disposed in accordance with local, state, and federal regulations.

Construction-period BMPs would include the following:

- Store only enough products required for the job;
- Products would be kept in their original containers with the original manufacturer's label and resealed when possible;

- Manufacturer's recommendation for proper disposal would be followed;
- The Project superintendent would do routine inspections to ensure that all material on-site is being stored and disposed in an appropriate fashion;
- All vehicles leaking oil or fluids would be scheduled for maintenance and would have drip pans under the leak when parked prior to the maintenance event;
- All personnel dealing with hazardous materials would be properly trained in the use and disposal of these materials in accordance with local, state, and federal regulations; and
- Material safety data sheets would be kept on-site during construction and operation of the solar farm.

Solid Waste

Construction waste would be disposed in accordance with local, state, and federal regulations. Any modules damaged or broken during construction are considered retrograde material and would be returned to a First Solar manufacturing facility, where they would be recycled into new modules or other new products.

2.3.5 Project Operation and Maintenance

The Proposed Project is expected to be fully operational in mid-2014. When completed, it would have 15 permanent employees. The proposed facility has a minimum expected lifetime of 30 years, with an opportunity for a lifetime of 50 years or more with equipment replacement and repowering.

The facility would operate continuously, seven days a week, during daylight hours (approximately 6:00 AM to 8:30 PM in the summer and 7:00 AM to 5:00 PM in the winter). While the facility would be largely self-sufficient upon completion of construction, periodic monitoring and maintenance activities would be required. Key elements of the monitoring and maintenance plan include monitoring and reporting the performance of the solar facility, conducting preventative and corrective maintenance, receiving students and other visitors, and maintaining site security. Once operational, the facility would be subject to a long-term monitoring and maintenance agreement.

The PV arrays are designed to withstand earthquakes and ground movement. Any realignment of the modules and structures would be handled on an as-needed basis.

Traffic

The Proposed Project would employ a permanent workforce of approximately 15 people. Only limited deliveries would be necessary for replacing PV modules and equipment during operation, and it is expected that there would be seven

deliveries per day at peak. In its operational phase, the Proposed Project is expected to generate 15 daily vehicle roundtrips from employees and 7 daily truck roundtrips from deliveries.

Water

The annual operational demand for water would be approximately 4,015 gallons per day, or 4.5 acre-feet per year. Water would be used primarily for sanitary uses by monitoring and maintenance staff. Water would also be needed for visitors to the Solar Energy Learning Center, equipment and vehicle cleaning and maintenance at the monitoring and maintenance facility, access road repair, and other potential uses. No water is currently anticipated to be used for electricity generation or for cleaning modules.

Wastewater

Sanitary wastewater needs during operation of the facility would be met with an on-site septic system. A Waste Discharge Permit would not be required from the Regional Water Quality Control Board (RWQCB) because the Proposed Project would not exceed 2,500 gallons per day of sewage. Rather, the septic system would be permitted by the San Luis Obispo County Planning and Building Department. Anticipated peak flow is 135 gallons into the leach field per day.

All wastewater during proposed operations and a portion during construction would be handled by the on-site septic system. The results of the soil percolation tests conducted in the vicinity of the proposed monitoring and maintenance facility demonstrate that an on-site septic system and leach field is most likely feasible in this location. Additional testing would be performed in accordance with the County's specific test procedure prior to final leach field design.

Power/Communication

The monitoring and maintenance facility would consume a small amount of power during the nighttime while the facility is not producing power. Supplemental power would be supplied by PG&E from the existing electrical distribution system in the area. The Proposed Project would not require any additional power sources for standby or emergency power supply.

For transmission of operational data and to support any employees working on the site, the Proposed Project would utilize existing wired or wireless telecommunications facilities. In the event that these facilities are not available in the project area, satellite communication gear would be used.

Lighting

Shielded lights would be installed at the monitoring and maintenance facility, Project substation, and PG&E switching station for security and maintenance purposes. In addition, there would be lights located in each inverter enclosure that would be turned on by a local switch when maintenance of the inverter

occurs at night. There would be no lights around the project perimeter to minimize the Project's visual impact on surrounding development and roads. All exterior lights would be shielded to minimize their impact on the night sky and on neighbors.

Vegetation Management and Maintenance

The Project Proponent is evaluating vegetation types that can support local wildlife populations without interfering with ongoing project operations. Under each PV module, a portion of the soil would not receive direct rainfall, and would be drier than the adjacent exposed soil. Moisture may migrate laterally due to wicking action of the soil, and an area of high moisture concentration is unlikely to occur under the PV modules.

Shading under the modules may reduce evapotranspiration of local plants, and lower light conditions may result in the shaded vegetation growing taller than vegetation exposed to direct sunshine throughout the day. A vegetation management plan would be implemented to control the height of vegetation and to control any invasive exotics. A Draft Vegetation Management Plan has been submitted to the County (Althouse and Meade 2011). This draft plan has been established based on the findings at a vegetation test site.

Hazardous Materials

The hazardous materials that would be stored on the Project Site are listed in **Table 2-7**, Hazardous Materials Stored On Site During Operation.

TABLE 2-7
HAZARDOUS MATERIALS STORED ON SITE DURING OPERATION

PRODUCT	USE	AMOUNT STORED ON SITE DURING OPERATION
Diesel Fuel	Vehicles	none
Gasoline Fuel	Vehicles	500 gallons (in a 500-gallon tank)
30W Motor Oil	Vehicles	none

The materials listed in Table 2-7 would be stored at the monitoring and maintenance facility. Similar to construction, a Hazardous Materials Storage and Spill Response Plan would be implemented for the management of these materials and would require that personnel be made aware of procedures for spill cleanup and procedures to report a spill. Spill cleanup materials and equipment would be located on-site, and personnel would be made aware of their location. Key employees would be trained in spill response procedures. BMPs would be used to reduce the risk of spills and other accidental exposure to hazardous materials.

Solid Waste

Minimal solid waste would be generated during project operations and would be disposed at area landfills. Any PV modules that needed replacing would be likely to be recycled through First Solar's pre-funded recycling program.

2.3.6 Solar Project Decommissioning

The Proposed Project has a minimum expected lifetime of 30 years or more, with an opportunity for a lifetime of 50 years or more with equipment replacement and repowering. If the site is decommissioned, the equipment would be deconstructed, most of the wire, steel, and glass that comprise the system would be recycled, and non-recyclable components would be disposed at area landfills. The Project Site itself could be converted to other uses in accordance with applicable land use regulations.

First Solar pre-funds all packaging, transportation, and recycling costs. Key elements of the First Solar Recycling Program include the following:

- Funding: With the sale of each module, First Solar sets aside the funds required for the collection and recycling in a restricted account controlled by a third-party insurance company;
- Registration: The site location of each module installation is registered with First Solar;
- Notice: Individual modules are labeled with Web site and telephone contact information in six languages, along with instructions for the user to return the product free of charge;
- Collection: First Solar manages the logistics of collecting each module and provides packaging and transportation to the recycling center;
- Recycling: All recycling processes are monitored to ensure compliance with local regulations regarding health, safety, and waste management; and
- Improvement: Results of the program are audited for continuous improvement.

2.3.7 Potential Permits and Authorizations

The permits and authorizations listed in **Table 2-8**, Potential Permits and Authorizations for the Proposed Project, have been or may need to be obtained prior to the initiation of groundbreaking or construction activities.

TABLE 2-8
POTENTIAL PERMITS AND AUTHORIZATIONS FOR THE PROPOSED PROJECT

PERMIT OR REGULATORY REQUIREMENT	ISSUING AGENCY	DESCRIPTIONS	STATUS
FEDERAL PERMITS AND AUTHORIZATIONS			
Section 404 Permit	USACE	This permit, issued under the CWA, authorizes the placement of dredge or fill material into jurisdictional waters and wetlands of the US.	Application is being prepared.
Section 7 Consultation, Endangered / Threatened Species Take Permit	US Fish and Wildlife Service	A permit or authorization authorizing activities that may "take" a species listed as threatened or endangered under the federal Endangered Species Act (ESA). This authorization would be obtained through Section 7 consultation, which would include submittal of a Biological Assessment (BA) and issuance by United States Fish and Wildlife Service (USFWS) of a Biological Opinion (BO) with incidental take statement.	BA for the solar facility and BA Supplement by PG&E for reconductoring have been prepared and will be submitted in early 2011.
Section 106 Consultation	State Historic Preservation Office (SHPO)	Section 106 of the National Historic Preservation Act requires federal agencies to consult with the SHPO on federal actions that may affect historic resources.	Section 106 consultation will be initiated in early 2011.
STATE PERMITS AND AUTHORIZATIONS			
Streambed Alteration Agreement	California Department of Fish and Game (CDFG)	A permit authorization for fill, diversion, obstruction, disposal, and other activities in or from the bed, channel, or bank of a state watercourse or lake may be required.	Application is being prepared, if necessary.
Incidental Take Permit, including Mitigation Agreement/Plan	CDFG	A permit or concurrence authorizing activities that may "take" any threatened or endangered species listed under the California Endangered Species Act (CESA). The mitigation agreement/ plan outlines binding mitigation measures to protect sensitive species.	Application is being prepared, as appropriate.
Encroachment Permit, Traffic Control Plan	California Department of Transportation (CalTrans)	A permit for an easement and right-of-way onto Highway 58 may be required.	Permit application has been submitted and traffic control plan has been drafted.
Construction General Storm Water Permit	State Water Resources Control Board (SWRCB) permit administered by Central Coast RWQCB	This is a pre-published general storm water permit that will be required for construction activities at the site.	Not yet started.

TABLE 2-8 *(continued)*
POTENTIAL PERMITS AND AUTHORIZATIONS FOR THE PROPOSED PROJECT

PERMIT OR REGULATORY REQUIREMENT	ISSUING AGENCY	DESCRIPTIONS	STATUS
Section 401 Certification	Central Coast RWQCB	This certification is triggered by, and must be received for, a USACE Section 404 permit.	Application is currently being prepared.
Portable Engine Registration for specified non-mobile portable engines	CARB	This registration is required for portable equipment such as that for well drilling, concrete batch plants, and rock crushing, as well as portable pumps and compressors.	Not yet started.
Cultural Resources Use Permit, Field Use Authorization, or Archeological Resources Protection Act Permit (if required)	SHPO	These permits, if required, must be obtained prior to construction.	Not yet started.
Notice of Construction (NOC) or Permit to Construct (PTC) for PG&E to construct Project switching station	CPUC	The CPUC will decide whether a NOC or PTC is needed. It will issue the permit to PG&E after the Topaz Solar Farm EIR is certified.	Not yet started.
LOCAL PERMITS AND AUTHORIZATIONS			
CUP	County of San Luis Obispo Department of Planning and Building	A discretionary permit allowing a specific land use.	Application submitted in July 2008 and revised in June 2009 and January 2010. CEQA analysis for granting CUP is underway.
Building Permit	County of San Luis Obispo Department of Planning and Building	A permit to construct a building or structure.	Not yet started.
Grading Permit	County of San Luis Obispo Department of Planning and Building	A construction permit typically required for excavation, fill, or other earthwork.	Not yet started.
Flood Control/ Drainage Channel Encroachment/ Crossing Permit	County of San Luis Obispo Department of Planning and Building	A permit required for work in or affecting designated floodplains.	Not yet started.
CEQA Authorization	County of San Luis Obispo Department of Planning and Building	Environmental review for discretionary permits required by the CEQA.	Draft EIR released in October 2010.
Encroachment Permit(s)	County of San Luis Obispo Public Works and Transportation, Traffic Engineering Group	Encroachment permits may be required for use of the County right-of-way along Bitterwater Road.	Not yet started.

TABLE 2-8 *(continued)*
POTENTIAL PERMITS AND AUTHORIZATIONS FOR THE PROPOSED PROJECT

PERMIT OR REGULATORY REQUIREMENT	ISSUING AGENCY	DESCRIPTIONS	STATUS
Sanitation Permit	County of San Luis Obispo Department of Planning and Building	This permit must be obtained for the proposed septic system for sanitary waste disposal of less than 2,500 gallons per day.	Not yet started.
Authority to Construct and Permit to Operate – New Stationary Source	County of San Luis Obispo APCD	Permits required in order to construct and operate the proposed facility.	Not yet started.
Fugitive Dust Permit	County of San Luis Obispo APCD	Permit required by the APCD prior to construction.	Not yet started.
Permit for Storage of Gasoline, Diesel or Other Organic	County of San Luis Obispo	This applies to storage of more than 250 gallons of gasoline or more than 1,500 gallons of diesel.	Not yet started.

2.3.8 Summary of Proposed Environmental Protection Measures

The Project Proponent has proposed some measures and San Luis Obispo County and other agencies may require additional measures to lessen the impact the Proposed Action would have on the human and natural environment. **Table 2-9**, Environmental Protection Measures, provides a summary of the measures that would be implemented during construction and operation to reduce environmental impacts and to ensure consistency with applicable federal, state, and County rules and regulations. Because the Project Proponent will comply with these measures, they have been incorporated into the Proposed Action analyzed in this EIS. These measures may be eliminated or revised, or new measures may be added, during the course of the CUP permitting process for the Proposed Project, expected to be finalized in mid-2011.

TABLE 2-9
ENVIRONMENTAL PROTECTION MEASURES

MEASURE NUMBER	ENVIRONMENTAL PROTECTION MEASURE BY ISSUE AREA
	AESTHETICS
Aes-1	PV arrays will be set back a minimum of 50 feet from paved roads, drainages, and adjacent properties. Setback distances will be greater in specific locations, as specified in Table 2-2.
Aes-2	Exterior lighting within the PV arrays or on the perimeter of the Project Site will not be allowed. For security and maintenance purposes, shielded lights will be installed at the monitoring and maintenance facility, substation, and switching station. Temporary, shielded, portable, task-specific lights will be used as needed, particularly in the construction staging areas. In addition, there will be lights located in each inverter enclosure that will be turned on by a local switch when infrequent maintenance of the inverter occurs at night.
	AIR QUALITY
Air-1	Shuttle buses will be used to transport the majority of the proposed 400 construction workers to the Project Site from designated lots in neighboring communities and towns.
Air-2	Dust control will be provided in accordance with San Luis Obispo County APCD requirements during project construction. Most roads will be treated with gravel or other road stabilization material, and disturbed areas will be sprayed with water regularly.
Air-3	All construction equipment will be maintained in proper tune according to manufacturer's specifications.
Air-4	All off-road and portable diesel powered equipment will be fueled with ARB-certified motor vehicle diesel fuel.
Air-5	Diesel construction equipment meeting ARB's Tier 2 certified engines or cleaner off-road heavy-duty diesel engines will be used, and the Proposed Project will comply with the state off-road regulation.
Air-6	All on- and off-road diesel equipment will not idle for more than five minutes. Signs will be posted in the designated queuing areas and/or job sites to remind drivers and operators of the five-minute idling limit. On very cold mornings there will be an exemption to this requirement for equipment that needs up to 15 minutes to warm to operating temperature.
Air-7	Staging and queuing areas will not be located within 1,000 feet of sensitive receptors.
Air-8	A Construction Activity Management Plan will be prepared and submitted to the APCD for review and approval prior to the start of construction.
	BIOLOGICAL RESOURCES
	Special Status Plants
Bio-1	To the extent feasible, the Proposed Project would avoid rare or sensitive plant species.
	Kit Fox
Bio-2	Measures to allow the kit fox access to and passage through the Project Site will be implemented by constructing fences around the project perimeter that will have small openings (approximately 12 inches by four to six inches) in the base of the fence approximately every 100 yards.
Bio-3	The low end of the PV modules will be a minimum of approximately 18 inches from the ground in order to allow for permeability and lines of sight for the kit fox.
Bio-4	Off-site lands that area provided as habitat mitigation will be restored to annual grassland or maintained as annual grasslands and managed to promote kit fox or other native species.

TABLE 2-9 *(continued)*
ENVIRONMENTAL PROTECTION MEASURES

MEASURE NUMBER	ENVIRONMENTAL PROTECTION MEASURE BY ISSUE AREA
Bio-6	Install at least 14 artificial dens (two per square mile) and 28 artificial escape dens (four per square mile) within the PV array fences at appropriate locations as determined by the Project biologist. Artificial den placement will be more than 25 feet from any of the Project components.
Bio-7	Install artificial escape dens on the outside of the proposed project perimeter fences approximately every 1,000 feet to provide permanent refuge locations.
Bio-8	Avoid the use of rodenticides in management practices.
Bio-9	Use a monitoring program to determine if kit fox take up residences and re-establish use of the proposed Project Site at levels equivalent to or better than existing use.
Bio-10	The proposed Project Site will be made available for research projects approved by USFWS if approved by the Project Proponent in advance and accompanied by necessary protections and indemnities.
Bio-11	Worker education programs regarding kit fox identification, life history, habits, population status, protection measures, and penalties for unauthorized take of kit fox will be provided for all construction and operational employees.
Bio-12	Public education material will be provided to all Project guests and visitors. Signage will be places at the Solar Energy Learning Center and the monitoring and maintenance building to provide education regarding kit fox and other rare species.
Bio-13	Pets will not be allowed on the proposed Project Site.
Bio-14	During construction, survey and monitoring measures will be conducted that meet the standard San Joaquin kit fox CEQA mitigation measures approved by the County of San Luis Obispo, the USFWS, and the CDFG for projects in the county.
Bio-15	Mowing or weed whipping within 25 feet of active dens will be prohibited. However, grazing will be allowed within 25 feet of dens.
Bio-16	New information concerning kit fox use of the Project Site will be made available for adaptive management of den sites and fence passages as specified in the Kit Fox Mitigation and Monitoring Plan.
Bio-17	A qualified kit fox biologist will submit monitoring reports to the County, CDFG, and USFWS as specified in the Kit Fox Mitigation and Monitoring Plan. Any kit fox located within fenced PV array areas will be reported to CDFG, USFWS, and the County within one week of sighting. Monitoring reports will include date of all site visits, survey methods, survey results, and recommendations.
Bio-18	Construction activities will be adjusted to avoid active kit fox and badger dens, nesting birds. and other seasonally sensitive resources.
Bio-19	Vegetate the ground within the Proposed Project to promote a natural habitat to support potential kit fox prey. Vegetation managed with grazing or other methods (subject to further testing to confirm feasibility).
	Wildlife Movement Corridors
Bio-20	In addition to fencing removal within PV arrays, cross fencing and wildlife wire fencing will be removed, where feasible, from 100-year flood boundary and other movement corridors within the Proposed Project to promote wildlife passage through the Project Site.

TABLE 2-9 *(continued)*
ENVIRONMENTAL PROTECTION MEASURES

MEASURE NUMBER	ENVIRONMENTAL PROTECTION MEASURE BY ISSUE AREA
	General Measures
Bio-21`	A biological monitor would be on site during all construction activities. The monitor would be responsible for ensuring that impacts on native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. Where appropriate, monitors would flag the boundaries of areas where activities would need to be restricted in order to protect native plants or sensitive habitats. Those restricted areas would be monitored to ensure their protection during construction
Bio-22	Prior to construction activities, a worker environmental awareness program would be prepared. All construction crews and contractors would be required to participate in the worker environmental awareness program prior to starting work on the Project. The program would include a review of the special status species and other sensitive resources that could exist in the project area, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel would be maintained
Bio-23	Avian Power Line Interaction Committee guidelines (APLIC 2006) and avian protection measures would be implemented to reduce the likelihood of bird collision and electrocution with collector lines. These measures include increasing separations of cables to achieve adequate distance for the species involved; covering energized parts and grounded parts with materials appropriate for providing incidental contact protection to birds; applying perch management techniques; and installing avian flight diverters on power lines.
Bio-24	Prepare and implement a Habitat Mitigation and Monitoring Plan (HMMP). To ensure the success of on-site preserved land and acquired mitigation lands required for compensation of permanent impacts on vegetative communities and listed or special status species, the Project Proponent would retain a qualified biologist to prepare a HMMP.
	California Annual Grassland
Bio-25	Develop a vegetation management plan that will specify grazing standards, residual vegetation quantities, and land management practices compatible with facility management and wildlife use.
	Vernal Pool
Bio-26	Establish a 50-foot setback to protect vernal hydrologic regimes and allow seasonal wildlife access to the pools. Vernal pools will be protected during construction by installation of orange fencing places at the setback boundary between the vernal pool and project areas. Note that the setback for vernal pools containing listed fairy shrimp is 250 feet.
	Ephemeral Wetland Depression and Natural Non-Wetland Pool
Bio-27	Establish a 25-foot setback to protect wetland hydrologic regimes and allow seasonal wildlife access to the pools. Ephemeral wetland depressions will be protected during construction by installation of orange fencing places at the setback boundary between the ephemeral wetland depressions and project areas. Note that the setback for ephemeral wetland depressions containing listed fairy shrimp is 250 feet.

TABLE 2-9 *(continued)*
ENVIRONMENTAL PROTECTION MEASURES

MEASURE NUMBER	ENVIRONMENTAL PROTECTION MEASURE BY ISSUE AREA
	Nesting Birds
Bio-28	Within one week of ground disturbance activities, if work occurs between March 15 and August 15, nesting bird surveys shall be conducted. If surveys do not locate nesting birds, construction activities may be conducted. If nesting birds are located, no construction activities shall occur within 100 feet of nests until chicks are fledged. A pre-construction survey report shall be submitted to the lead agency immediately upon completion of the survey. The report shall detail appropriate fencing or flagging of the buffer zone and make recommendations on additional monitoring requirements. A map of the Project Site and nest locations shall be included with the report. The Project biologist constructing the nesting survey shall have the authority to reduce or increase the recommended buffer depending upon site conditions.
	Special Status Plants
Bio-29	The design of the Proposed Project, for both Alternative A and Alternative B, has avoided many of the rare or sensitive plant occurrences that were identified in rare plant surveys conducted for the Project. The locations of these plants are included in the Final Biological Report for the Proposed Project (Althouse and Meade, 2010) and are defined in this EIS as Avoided Plants.
Bio-30	Avoided Plants within 100 feet of proposed Project facilities should be protected with orange construction fencing placed between the occurrence and constriction activities.
Bio-31	Temporary access routes (located off main gravel access roads) that are used during construction will be planned to avoid Avoided Plants.
	Special Status Birds
Bio-32	Occupied nests of special status bird species shall be mapped using GPS or survey equipment. Work shall not be allowed within the 100-foot buffer while the nest is in use. The buffer zone shall be delineated on the ground with orange construction fencing where it overlaps work areas.
Bio-33	Occupied nests of special status bird species that are within 100 feet of project work areas shall be monitored at least every two weeks throughout the nesting season to document nest success and check for Project compliance with buffer zones. Once nests are deemed inactive and/or chicks have fledged and are no longer dependent on the nest, work may commence in these areas.
	Burrowing Owl
Bio-34	Pre-construction surveys for burrowing owls shall be conducted not more than 30 days prior to any work that affects previously undisturbed grassland habitat containing burrows. The pre-construction surveys shall be conducted in a manner sufficient to determine no burrowing owls are present in the work areas, including a 250-foot buffer surrounding the works areas. Pre-construction surveys shall be conducted throughout the year, when work is proposed, to account for breeding, wintering, and transient owls.
	Special Status Small Mammals
Bio-35	A biological monitor shall be present during construction activities in all areas identified as potential habitat for special status mammals that have not previously been disturbed by construction. The monitor shall be qualified to capture and relocate any special status species that are found during construction. The monitor shall have the authority to stop work, if special status species are encountered, for any duration necessary to capture and relocate the animals.

TABLE 2-9 *(continued)*
ENVIRONMENTAL PROTECTION MEASURES

MEASURE NUMBER	ENVIRONMENTAL PROTECTION MEASURE BY ISSUE AREA
	Tule Elk and Pronghorn Antelope
Bio-36	Wildlife movement corridors are proposed through the project arrays. Proposed pathways are over one mile in width in places. Minimum pathway width is approximately 500 feet. Pronghorn and elk could move through the pathways.
Bio-37	Fencing at existing crossing sites along Highway 58 on Project Site lands and fences within the pathways in the proposed Project Site will be eliminated or made antelope-friendly to facilitate passage.
	GEOLOGY AND SOILS
Geo-1	Existing hydrologic conditions will be maintained on the Project Site.
Geo-2	Silt fences will be used for erosion control along the downstream edge of groups of arrays, and fiber rolls will be placed along roads and easements.
Geo-3	A construction SWPPP will be implemented prior to the commencement of soil-disturbing construction activities.
Geo-4	Design recommendations from the Project geotechnical report pertaining to foundation depths, steel pile coverings, grounding measures, and types of structural cement will be incorporated in the final project design.
	HAZARDS AND HAZARDOUS MATERIALS
Haz-1	Any First Solar modules damaged or broken during shipment to the Project Site or during construction will be recycled into new modules or other products. Any additional construction waste generated will be removed in accordance with applicable requirements.
Haz-2	Vegetation will be managed in an effort to minimize potential for vegetative fuel buildup. A Fire Protection Plan in compliance with County regulations will be prepared and implemented for the Project.
Haz-3	A Hazardous Materials Storage and Spill Response Plan will be prepared and implemented to address management of hazardous materials during construction.
Haz-4	The Project Proponent will prepare a hazardous materials business plan, which will include a hazardous material inventory, emergency response procedures, training program information, and basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed of.
Haz-5	The Project Proponent will prepare a Spill Prevention Control and Countermeasure (SPCC) Plan, which will potential spills of these fluids from the on-site storage tanks and transformers.
HA-6	An environmental training program will be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, and SWPPP measures, to all field personnel.
	INFRASTRUCTURE
IN-1	The Project Proponent will include details on construction plans showing the design features of roads, buildings, and the Project Site that will ensure adequate emergency access. These design features would be reviewed and verified by Cal Fire and the Sherriff's Department to ensure adequacy.

TABLE 2-9 *(continued)*
ENVIRONMENTAL PROTECTION MEASURES

MEASURE NUMBER	ENVIRONMENTAL PROTECTION MEASURE BY ISSUE AREA
	LAND USE AND PLANNING/AGRICULTURE
LU-1	If Alternative B is selected, the Project Proponent will work with San Luis Obispo County Department of Planning and Building, the County Department of Agriculture, and the California Department of Conservation to cancel Williamson Act contracts.
LU-2	During construction and all ground-disturbing activities and until one year after construction is complete, the Project Proponent shall provide a toll-free general phone number and the name and retain a local public liaison. The name and contact information of the public liaison shall be made available to all potentially affected property owners, including all properties within one mile around project boundaries and properties along approved truck haul routes. The toll-free access number and the identified local public liaison shall act as points of contact and interface between property owners and construction crews. The local public liaison shall be available both in person and by phone, as necessary, for at least 30 days prior to the start of any construction-related activities and for up to six months following construction. During construction, the local public liaison shall respond to all construction-related questions and concerns within a 24-hour period. Post-construction responses shall be made within one week. Monthly, for the duration of construction and for one year following completion of construction, the Project Proponent shall generate a liaison summary of all comments received and how these issues were addressed. The compliance documentation shall also include the name and address of the person (if known) contacting the local public liaison and the date of contact. The compliance documentation shall be submitted to the County of San Luis Obispo Planning and Building Department throughout the duration of construction and for one year following construction.
LU-3	Two weeks prior to the start of construction, the Project Proponent shall give at least 30 days advance notice of the start of any construction-related activities to potentially affected property owners. The notification shall include the toll-free general phone number and contact information for the local public liaison. Notification shall be provided by: (1) mailing notices to all property within a one-mile radius of the Project Site's boundaries; (2) placing notices in local newspapers; and, (3) posting and maintaining the notice at a centrally located posting site (such as the community center) that can be readily viewed and accessed by local residents. Compliance documentation shall be submitted to the County of San Luis Obispo Planning and Building Department at least two weeks prior to the start of construction.
LU-4	*Provide Quarterly Construction Updates.* Following publication/transmittal of the advance notification of construction, the Project Proponent shall provide all potentially affected property owners with updates and changes to all of the information provided in the pre-construction notification. The updates shall be provided every quarter for the duration of all construction-related activities in a manner consistent with the notification procedures prescribed above (mailing, newspaper publication, and centrally located posting site). The updates shall continue to provide the toll-free number and the name and phone number of the local public liaison to respond to all construction-related questions and concerns. The local public liaison shall continue to respond to all questions and complaints within a 24-hour period during construction and within one week for post-construction activities.
	NOISE
Noi-1	The Proposed Project will comply with County noise standards during construction and operation of the Project.

TABLE 2-9 *(continued)*
ENVIRONMENTAL PROTECTION MEASURES

MEASURE NUMBER	ENVIRONMENTAL PROTECTION MEASURE BY ISSUE AREA
Noi-2	The Proposed Project will employ noise-suppression techniques during construction and decommissioning such as the following: • Trucks and other engine-powered equipment shall include noise reduction features such as mufflers and engine shrouds that are no less effective than those originally installed by the manufacturer. • Trucks and other engine-powered equipment shall be operated in accordance with posted speed limits and limited engine idling requirements. • Truck engine exhaust ('jake') brake use shall be limited to emergencies. • Back-up beepers for all construction equipment and vehicles shall be adjusted to the lowest noise levels possible, provided that OSHA and Cal/OSHA's safety requirements are not violated. • Vehicle horns shall be used only when absolutely necessary, as specified in the contractors' specifications. • Radios and other "personal equipment" shall be kept at low volume.
	PALEONTOLOGICAL RESOURCES
Pal-1	The Project Proponent will prepare a Paleontological Monitoring and Treatment Plan and submit it to the San Luis Obispo County for review and approval. The Plan will be based on Society of Vertebrate Paleontology (SVP) guidelines and meet all regulatory requirements.
	PUBLIC SERVICES
PS-1	Twenty-four-hour on-site security will be provided to limit the need for outside emergency response services.
PS-2	A Health and Safety Plan will be prepared and implemented for the Project. A safety and compliance director will be assigned to ensure that construction and operation of the solar facility is carried out consistent with OSHA and CalOSHA.
	TRANSPORTATION AND TRAFFIC
Tra-1	The proposed Topaz Truck Management Plan will be implemented in order to maximize safety and minimize congestion on Highway 58 westbound from Interstate 5, which is the main access route to the Project Site. The necessary permits will be obtained from CalTrans for the implementation of the plan.
Tra-2	The use of shuttle buses will be required to transport the majority of the proposed 400 to 500 construction workers to the Project Site from designated lots in neighboring communities and towns.
	WASTEWATER
Was-1	Additional testing will be performed in accordance with the County's specific test procedure prior to final leach field design.
	WATER RESOURCES
WQ-1	The Project Proponent will compensate for the loss of ephemeral drainage habitat through in-kind habitat restoration of a portion of the main drainage at a minimum ratio of 2:1. The objective of restoring a portion of the main ephemeral drainage that has connectivity to Soda Lake would be to improve existing water quality and habitat functions. Restoration components may include removal of accumulated sediment, bank stabilization, planting of vegetation, sediment control measures, establishing protective habitat buffers, placing a conservation easement over the restored drainage and buffer, and funding an endowment that will provide for long-term management.

TABLE 2-9 *(continued)*
ENVIRONMENTAL PROTECTION MEASURES

MEASURE NUMBER	ENVIRONMENTAL PROTECTION MEASURE BY ISSUE AREA
WQ-2	Erosion control measures will be implemented during project construction activities to prevent the flow of sediment downstream.
WQ-3	Panels will not be washed in order to minimize water usage during project operation.

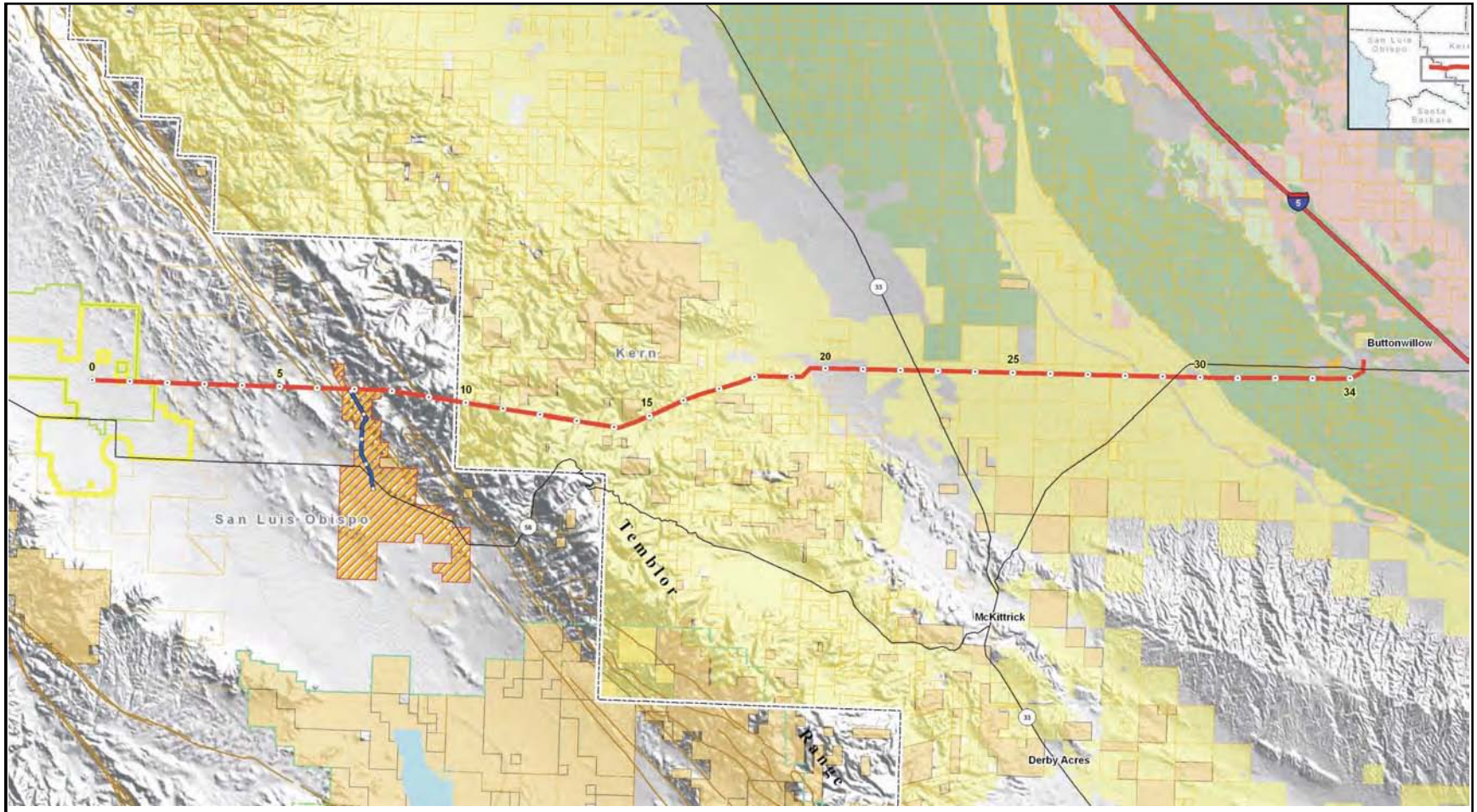
2.4 CONNECTED ACTION

CEQ regulations define the scope of an EIS to include those actions that are closely related, or connected, to a proposed action. Actions are connected if they automatically trigger other actions that may require an EIS; cannot or will not proceed unless other actions have been taken previously or simultaneously; or are interdependent parts of a larger action and depend on the larger action for their justification (40 CFR §1508.25).

CAISO has determined that transmission line upgrades would be required to deliver the final 150 MW of energy generated by the Proposed Project and the 250 MW generated by the CVSR project to the transmission grid. DOE considers this upgrade to be a connected action to the Proposed Project that should be evaluated in this EIS. The proposed CVSR Project Site is four miles southeast of the Project Site. PG&E, which is responsible for the upgrades, anticipates filing an application with the CPUC after the CEQA EIR processes for both projects are complete. Construction is anticipated to begin in late 2011 and would take approximately 20 months to complete. The upgrades that would be required to connect the final 150 MW of the Proposed Project to the grid include reconductoring approximately 35 miles of the Morro Bay to Midway 230-kV transmission line and constructing a new switching station at the proposed Topaz solar facility (**Figure 2-13**, Proposed Reconductoring). Construction of the proposed switching station at the Proposed Project was discussed in Section 2.3.1, PG&E Transmission System. Reconductoring is discussed below.

Reconductoring refers to the stringing of new higher-capacity conductors to replace the existing lines, the extension of some towers, and the replacement of some towers to handle the additional weight. Reconductoring would begin at the switching station for the Proposed Project and end at the Midway Substation. This segment of line includes 171 lattice steel towers, most of which are double circuit towers.

Reconductoring is generally accomplished by disconnecting an old conductor and using it to pull a sock line (rope) through temporary pulleys mounted on each tower until the sock line reaches the end of the section to be reconductored. Once in place, the sock line is then used to pull the new conductors into place. An alternative is to connect the old conductor directly to the new conductor and use it to pull the new conductor into place.



SOURCE: Aspen Environmental Group 2010b

To accommodate 150 MW of power generated by the proposed Topaz Solar Farm project and the power generated by the other projects, PG&E would reconductor 35 miles of the Morro Bay to Midway 230-kV transmission line.

Proposed Reconductoring

PG&E Morro Bay to Midway Transmission Line
San Luis Obispo and Kern Counties, CA

Figure 2-13

The work would involve 20-person work crews on each end of a segment. One crew would be at the pull site, while the other crew would be at the tension site near a tower at the other end of the pull. Crews would be equipped with large tractor-trailer units used to feed out the new line or wind in the old line on trailer-mounted spools. Two or three utility trucks carrying tools and other materials would also be employed. The tensioning crew would employ a tensioner truck, which carries a large drum that is used to put rear tension on the conductor being pulled. Each pull is generally one to five miles in length, and each conductor is pulled separately until all three phases of a circuit are in place.

The tensioning crew would access the tower and disconnect the old conductor. The old conductor would be attached to the sock line or directly to the new conductor located on spools on the tensioner truck. The pull site crew would climb each tower or be transported to the tower via helicopter, disconnect the old conductors, and attach them to take-up spools on trucks below the tower. Other crews would set up temporary netting structures across busy roads and other areas as needed to protect those areas in the unlikely event that a conductor breaks and falls to the ground.

Once all protective structures are in place, the pulling crew would begin to wind the old conductors onto the spools, while the tensioning crew would keep the old conductor taut to prevent it from sagging to the ground. Once the new conductor is in place, it would be disconnected from the pulleys, relocated to a higher position (if a tower extension was installed), and permanently mounted to the end of new insulator strings.

Impacts related to reconductoring would generally be restricted to pull and tension sites, as all work between those two sites occurs overhead. Activities with potential effects result from truck movement of helicopter operations at pull and tension sites, and any work on tower structures themselves. It is assumed that approximately 17 pull and tension sites and 3 construction work areas at road crossing would be used.

While the number of towers to be replaced is unknown at this time, the analysis assumes that 10 percent of the towers would be entirely replaced. Replacement towers would generally occur within 75 feet of the towers that they will replace. Towers would be constructed and erected at the site by crane, or constructed off-site and transported to the site by helicopter. Installation of replacement tower foundations would be conducted as described under Section 2.3.1, PG&E Transmission System, *Interconnection Configuration*. Reconductoring would also require modification to some existing access roads. Exact locations of these activities have not been determined but would be selected to avoid sensitive resources. Preliminary estimates of ground disturbance are included in **Table 2-10**, PG&E Upgrades, Estimated Disturbance by Work Area.

TABLE 2-10
PG&E UPGRADES, ESTIMATED DISTURBANCE BY WORK AREA

WORK AREA	COUNTY	DIMENSIONS AND SITE DESCRIPTION
Topaz Switching Station	San Luis Obispo (SLO)	600 feet by 650 feet (9 acres)
Tension/Pull Sites	SLO and Kern	300 feet by 300 feet (2.1 acres) each Approximately 22 sites in all for 35.7 acres (9 acres in SLO and 13 in Kern)
Landing Zones	SLO and Kern	11.6 acres (6.6 acres on two sites in SLO, 5 acres on four sites in Kern)
Access Roads	SLO and Kern	27.2 acres
Line Crossings	Kern	50 feet by 50 feet (0.4 acres each) 7 crossings required
Two Distribution Line Crossings	Kern	100 feet by 50 feet (0.6 acres total over 5 crossings
Foreign Line Crossing	Kern	100 feet by 50 feet (0.1 acre)
Caneras-Taft and Temblor-Kernridge Line Crossing	Kern	100 feet by 50 feet (0.1 acre)
Belridge Tap Line Crossing	Kern	75 feet by 50 feet (0.1 acre)
Diablo Midway #2 Line Crossing	Kern	100 feet by 50 feet (0.1 acre)
Fiber Line Stringing	Kern	1,250 feet by 30 feet (0.9 acre)
Road Crossing Work Areas	Kern	7.2 acres over 3 crossings

Source: Adapted from San Luis Obispo County 2010, Appendix 4, Table Ap4-2

PG&E has proposed specific measures to reduce or avoid impacts on the environment resulting from the required upgrades to its Morro Bay to Midway 230-kV transmission line; these measures are part of the connected action. More information on the connected action is included in Appendix B of this EIS.

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1 INTRODUCTION

This chapter describes the existing social, economic, and environmental conditions of the Project Site and surrounding area, the potential environmental impacts that could result from implementing the Proposed Action, the project-specific alternatives (Alternative A and Alternative B), or the no action alternative described in Chapter 2, and the cumulative effects on each resource area resulting from the Proposed Project in combination with other past, present, and reasonably foreseeable future actions occurring in the project area.

Chapter 3 focuses on those resource areas potentially affected by the Proposed Action, including land use, visual resources, air quality, noise, geology and soils, water resources, biological resources (vegetation, wildlife, and special status species), cultural resources, paleontological resources, socioeconomics, environmental justice, public health and safety/hazardous materials, transportation, and infrastructure. The chapter is divided into sections for each resource area.

3.1.1 Affected Environment

The affected environment, or environmental setting, for each resource area provides a baseline against which to evaluate the changes that would occur from implementing the Proposed Action, the project-specific alternatives (Alternative A and Alternative B), and the no action alternative. Each affected environment section discusses the regulatory framework governing the resource, describes the regional setting and resource conditions specific to the Project Site, and summarizes the resource setting associated with the PG&E Reconductoring Project.

3.1.2 Environmental Impacts

Following a discussion of the affected environment for each resource area is a discussion of the environmental impacts that could result from implementing the Proposed Action, project-specific alternatives described in Section 2.1.3 and referred to as Alternative A and Alternative B, reconductoring the Morro Bay to Midway 230-kV transmission line, and the no action alternative.

The no action alternative assumes that no Project would be constructed, allowing for a comparison of impacts under baseline conditions against impacts from Project implementation. In some cases, a brief discussion of potential impacts that would occur if the Project is constructed using alternate sources of funding is provided, if these impacts would differ from impacts described under the Proposed Action.

Characterization of Potential Impacts

Where possible, potential impacts associated with the Proposed Action and alternatives are quantified. In some cases, it is not possible to quantify impacts; in these cases, a qualitative assessment of potential impacts is presented. The following descriptors are used qualitatively to characterize impacts on respective resource areas:

- ***Beneficial*** – Impacts would benefit the resource.
- ***Negligible*** – No apparent or measurable impacts are expected; may also be described as "none" if appropriate.
- ***Minor*** – The action would have a barely noticeable or measurable adverse impact on the resource.
- ***Moderate*** – The action would have a noticeable or measurable adverse impact on the resource. This category could include potentially significant impacts that would be reduced to a lesser degree by the implementation of mitigation measures.
- ***Substantial*** – The action would have obvious and extensive adverse effects that could result in potentially significant impacts on a resource despite mitigation measures.

Additionally, impacts may consist of direct or indirect effects:

- ***Direct impacts*** are defined as those caused by the action and occurring at the same time and place. See 40 CFR Section 1508.8(a). Examples include habitat destruction, soil disturbance, air emissions, and water use.
- ***Indirect impacts*** are defined as those that are caused by the action but occur later in time or are farther removed in distance from the action, but are still reasonably foreseeable. See 40 CFR Section 1508.8(b). Examples include changes in surface water quality

resulting from soil erosion, and alteration of wetlands resulting from changes in surface water quantity.

Context and intensity are taken into consideration in determining a potential impact's significance, as defined in 40 CFR Section 1508.27. The context of an impact takes into account the region of influence, the affected interests, and the locality. The intensity of a potential impact refers to the severity and duration of the impact and includes, among other factors, the consideration of beneficial and adverse impacts; the level of scientific controversy associated with a project's impacts; whether the action establishes a precedent for future actions with significant effects; the level of uncertainty about project impacts; or whether the action threatens to violate federal, state, or local laws or requirements imposed for protection of the environment.

The County of San Luis Obispo has prepared a Draft Environmental Impact Report (Draft EIR) for the Proposed Project pursuant to the California Environmental Quality Act (CEQA); this document was released for public review in October 2010 (San Luis Obispo County 2010a). A Final EIR is being prepared. CEQA requires a lead agency (in this case, the County of San Luis Obispo) to identify the criteria used to determine the significance of potential project-related impacts. A significant impact is defined by CEQA as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project." In comparison, NEPA defines significance as effects or issues of sufficient context and intensity that an EIS is required. By electing to prepare an EIS, DOE (as the NEPA lead agency) has deemed that the Proposed Project has the potential to result in a significant impact on the environment. Because of the procedural and definitional differences between CEQA and NEPA, the characterization of impacts may differ between the EIS and EIR. For this reason, criteria are provided for each resource area to identify the thresholds that would trigger an impact on that resource. As NEPA does not prescribe a list of significance criteria, these criteria were developed based on the construction and operational requirements of the Proposed Project and the environmental setting in which the Project would be located.

Environmental Protection Measures

As discussed in Section 2.3.6, Summary of Proposed Environmental Protection Measures, the Project Proponent has proposed measures to lessen the impact that the Proposed Project would have on the human and natural environment. These measures, described in Table 2-9, would be implemented during construction and operation to reduce environmental impacts and to ensure consistency with applicable federal, state, and county rules and regulations. Because the Project Proponent has committed to these measures, they have been incorporated into the Proposed Action analyzed in this EIS. Additional measures to minimize potential impacts were identified by the County of San Luis Obispo in the Topaz Solar Farm Draft EIR. These measures, where

appropriate to the NEPA analysis, are described in the Chapter 3 resource sections. These are measures that may be required by the County and that will be finalized through the County process. As such, the measures presented in this chapter may be revised by the County prior to adoption of the Final EIR for the Topaz Solar Farm Project.

3.2 LAND USE

This section describes effects on land use that would be caused by implementing the Proposed Project. Existing laws and regulations relevant to land use on the Project Site and surrounding areas are described and analyzed to determine effects. Federal, state, and local laws and regulations are considered in this section.

3.2.1 Affected Environment

Regulatory Framework

Farmland Protection Policy Act

Under the Farmland Protection Policy Act (FPPA) of 1981 (Sections 1539-1549 PL 97-98), the Secretary of Agriculture is directed to establish and carry out a program to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland." Under the FPPA, the Secretary of Agriculture established criteria for use by federal agencies to consider effects on farmland. As stipulated by the FPPA, federal agencies are to: (1) use the criteria to identify and account for the adverse effects of their programs on the preservation of farmland, (2) consider alternative actions, as appropriate, that could lessen adverse effects, and (3) ensure that their programs, to the extent practicable, are compatible with state, units of local government, and private programs and policies to protect farmland (7 USC 658.1). Federal agencies comply with the FPPA by completing a Farmland Conversion Impact Rating Form for submittal to the US Department of Agriculture Natural Resources Conservation Service (NRCS).

California Land Conservation Act (Williamson Act)

The California Land Conservation Act, or Williamson Act, was enacted in 1965 to keep agricultural land from being converted to urban land uses in an effort to curtail urban sprawl (California Department of Conservation 2010). The act allows counties and cities to designate agricultural preserves, or Williamson Act lands, and to assess property tax on privately owned agricultural lands based on the income-producing value of property for agricultural use rather than to assess property taxes based on the property's assessed market value (California Department of Conservation 2010), resulting in reduced property taxes for the agricultural land owner. The landowner must sign a contract with the county or city agreeing not to develop the land for a minimum 10-year period in order to

receive the tax rate. As each year of the contract elapses, a year is added to the end of the contract to maintain an ongoing 10-year term unless a party to the contract files for nonrenewal or petitions the legislative body for cancellation. Land uses allowed under the Williamson Act are agricultural and limited ancillary uses and are governed by California Government Code Section 51238.1. In accordance with state law, each city and county has the exclusive authority to determine land uses that are or are not compatible with Williamson Act contracts, provided that these uses are not prohibited by the Williamson Act (California Department of Conservation 2010). Only Study Area B contains lands subject to the Williamson Act. Of its 1,795 acres of land under Williamson Act contracts, 1,212 acres would likely be within the fenced Project boundary. Study Area A does not include any lands under Williamson Act contract.

County of San Luis Obispo General Plan

The San Luis Obispo County General Plan (2007) identifies the County's development goals and public policies related to the distribution of future land uses. It identifies the County's land use, circulation, environmental, economic, and social goals and policies as they relate to land use and development. The plan is made up of elements, specific plans, area plans, design plans, and frameworks for planning and is supported by adopted issue-specific plans, policies, and the County's land use ordinance. The Framework for Planning (Inland) (San Luis Obispo County 2006) is the land use element of the general plan that governs land use policy for inland San Luis Obispo County, while the Shandon-Carrizo Inland Area Plan (San Luis Obispo County 2003) contains land use and circulation elements specific to the Project Site and surrounding area.

The general plan classification for all parcels within the Project study areas is Agricultural. The zoning designation for these lands is Agriculture. Some Project lands are within a Flood Hazard zone, while one area is within a Geologic Study Area. These designations and zones are defined below:

- Agricultural: Agricultural land use zones were identified by their soils, potential for productivity, distance from urban zones, proximity to other agricultural lands, overall land use pattern, or economic viability for agricultural purposes. The purpose of these districts is to designate areas that have potential for productive agricultural use, to protect agricultural economies, and to protect prime soils for agricultural viability. The conversion of agricultural lands to other uses is allowed when such a conversion would be appropriate or because the potential agricultural productivity of a site is infeasible due to factors such as soil type, topography, water supply, or surrounding land uses (San Luis Obispo County 2007). The agricultural designation allows many land uses with a Conditional Use Permit, including photovoltaic energy generation (San Luis Obispo County 2010a). As discussed in Chapter 2, the

Project Proponent has applied for a CUP to allow a solar power plant as a permitted use on the site.

- Flood Hazard: Flood hazard zones are designated to avoid damage to property or natural resources and to encourage land development that minimizes adverse effects on water flow and drainage. Projects in flood areas must be designed and constructed with consideration for natural site features and in a way that does not harm designated stream courses (San Luis Obispo County 2007). A portion of each study area is within a flood zone, as discussed in Section 3.7, Water Resources, and depicted on Figures 3-16 and 3-17.
- Geologic Study Area: Geologic study areas delineate all potentially and recently active faults in California and identify areas of high landslide risk or liquefaction potential. The objectives of a geologic study area are to ensure that structures for human occupancy are not constructed over active fault areas and that proposed Projects in the study area are subject to soil and geologic evaluations to determine suitability for development (San Luis Obispo County 2007).

The former energy element of the general plan (1995) identified the Carrizo Plain as a unique solar resource, noting that only the Mojave Desert has a greater solar potential in California. The energy element was superseded by the Conservation and Open Space Element of the General Plan (2010f), which includes a policy to encourage and support the development of solar and wind power and other renewable energy systems as commercial energy enterprises (Policy E.6.2).

Regional Setting

The Carrizo Plain is located in San Luis Obispo County midway between San Francisco and Los Angeles (see Figure 1-1). The county landscape is defined by five mountain ranges, which form five principal drainage basins aligned on a predominantly northwest to southeast axis. These five ranges are the Santa Lucia, Temblor, Caliente, La Panza, and San Luis Mountains. None of the mountain ranges are especially high in elevation, but they are considerable visual and climactic barriers between regions.

Most urban and agricultural uses in the county occur in the valleys and coastal terraces of the westernmost ranges (San Luis Obispo County 2007). Throughout the Project region, there are agricultural, ranching, petroleum development, mining, and federal land uses.

The Carrizo Plain area is predominantly rural and remote in character. There are large expanses of agriculture, open space, and undeveloped lands within the plain. The predominant existing land use and designated land use category within the Carrizo Plain is agriculture, specifically dry cropping and range lands.

Project Setting

The Project Site is located on private lands in unincorporated eastern San Luis Obispo County. The Project Site is approximately two miles north of California Valley and six miles northwest of the Carrizo Plain National Monument. Santa Margarita and Highway 101 are approximately 40 miles to the west, and Buttonwillow and Interstate 5 are approximately 48 miles to the east. Access to the Project Site is from California State Highway 58 to the north and south and Bitterwater Road to the west.

The Shandon-Carrizo Planning Area Rural Land Use Planning Area maps designate the Project Site and surrounding lands as agriculture (San Luis Obispo County 2010b). Lands associated with the Hubbard Hill Freeborn Mountain Sensitive Resource Area, located three miles southwest of the Project Site and managed by the Bureau of Land Management, are designated open space, while lands within the California Valley village boundaries are designated primarily as residential suburban, with some agriculture and open space uses (San Luis Obispo County 2010b, 2010c). There are no County-designated recreational resources within the planning area, though the federally designated Carrizo Plains National Monument offers recreational opportunities such as auto touring, hiking, camping, hunting and shooting, equestrian uses, nature observation, and mountain biking (BLM 2010a).

Land uses surrounding the Project Site include grazing to the east and grazing and dry farming to the north, south, and west. All of the surrounding lands are privately owned. There are residences along Highway 58, Bitterwater Road, and Soda Lake Road, including residences within the Project Site that are expected to remain. The location of area residences can be seen in Figures 2-2 and 2-3, and residences within the Project boundaries are discussed below.

Study Area A

Study Area A includes approximately 7,800 acres, and the Proposed Project would occupy up to 4,100 acres (Figure 2-2). Study Area A is generally bounded by Bitterwater Road to the west and Soda Lake Road to the east; Highway 58 bisects the study area to the north and south. Within these boundaries there are three exclusion areas that are not part of the study area. Two of these exclusion areas contain occupied single-family residences, and one contains an existing electrical substation. The single-family residences are located in Section 21 of Township 29 South, Range 18 East (north of Highway 58) and Section 4 of Township 30 South, Range 18 East (south of Highway 58), while the substation lies along the transmission line at the northwest corner of Section 27 of Township 29 South, Range 18 East. These exclusion areas are depicted on Figure 2-2.

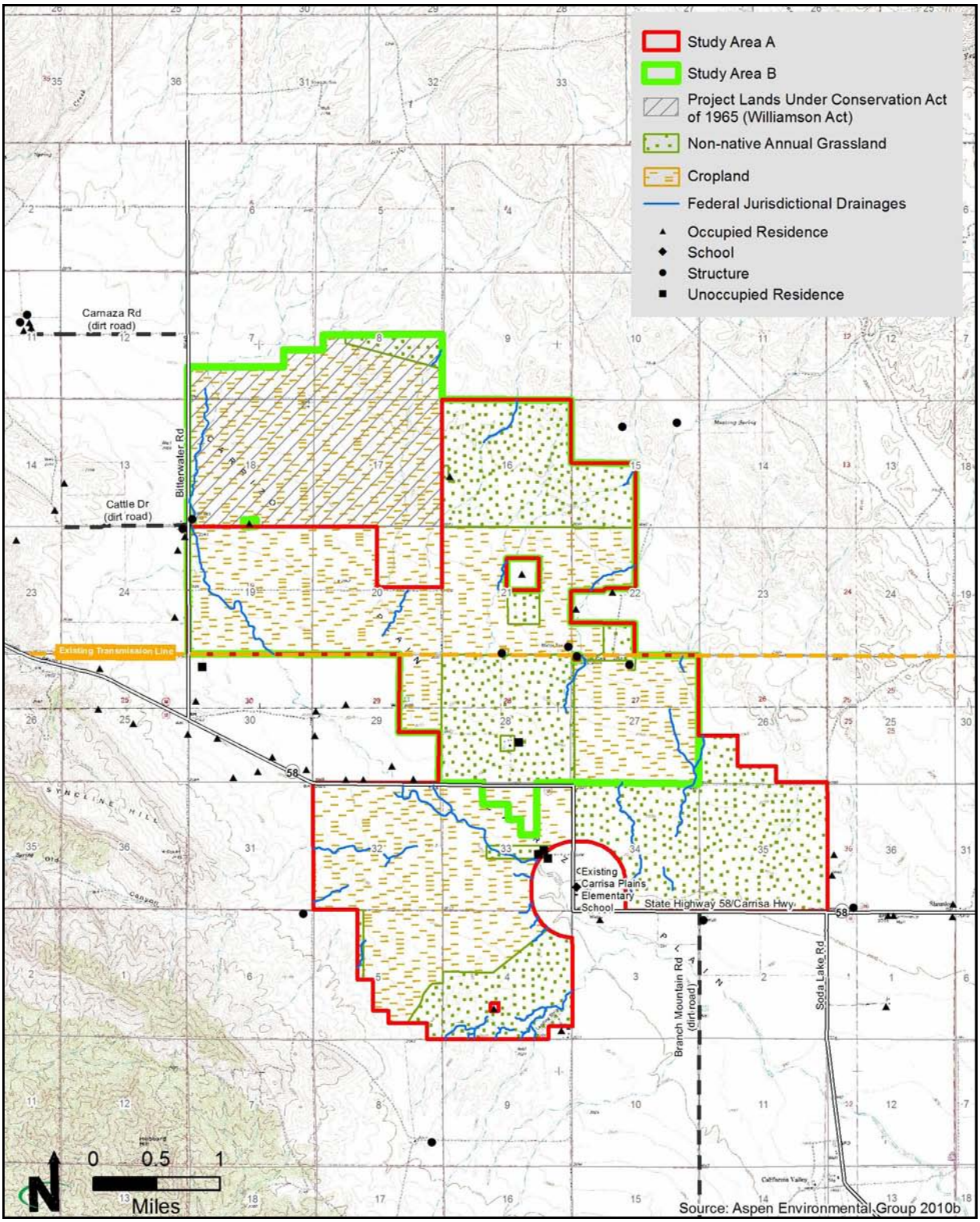
All land parcels within Study Area A are designated by the general plan as agriculture, with some parcels additionally designated as part of a combining Flood Hazard zone, and one parcel designated as a combining Geologic Study

Area (combining zones means that they are overlays to the land use and zoning designation) (San Luis Obispo County 2007). The Carrisa Plains Elementary School lies south of Study Area A, with a one-third-mile setback created as a buffer between the study area boundary and the school. The school has a public facilities zoning designation. All other land parcels surrounding Study Area A, besides the school, are designated as agriculture.

Lands within Study Area A are characterized by actively dry-farmed and fallow flat land. Dry farming involves tilling, rolling, and accumulating soil moisture over two to three years, and then planting. A fallow field may have been recently tilled, or may have been recently rolled, or may be growing a volunteer crop. There are some low, rolling hills with slopes greater than five percent in the southern portion of the study area. Swales associated with agricultural use run throughout the study area, and existing PG&E 230-kV and 115-kV transmission lines and several unpaved roads traverse Study Area A. Farming practices are rotational and include farming fields one year and leaving them to grow a volunteer crop the following year to build up moisture and nutrients in the soil; none of the study area lands are irrigated. **Figure 3-1**, Land Use Map, depicts areas of the site that are cropland and areas that are nonnative annual grasslands.

One 655-acre parcel within Study Area A is governed by a land conservation plan as part of a settlement agreement between PG&E and the California Public Utilities Commission in its 2001 bankruptcy filing. This plan contains conservation objectives for the parcel and guides the future use and transfer of the parcel. PG&E proposed to exchange the 655-acre parcel for two privately owned parcels totaling 1,200 acres within the boundary of the Carrizo Plains National Monument. PG&E's request was approved by the Board of Directors of the Stewardship Council, and the 1,200 acres will be donated to the Bureau of Land Management for permanent protection (Stewardship Council 2010).

Approximately 1,440 acres of Study Area A (Sections 34 and 35) are registered in the US Department of Agriculture's Environmental Quality Incentive Program, which is a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. This program offers financial and technical assistance to eligible participants to install or implement structural and management practices on eligible agricultural lands. To cancel an Environmental Quality Incentive Program contract, the property owner must submit a letter requesting cancellation, and cancellation may entail cost recovery for rangeland improvements that were funded by the program.



The Project Site and most of the surrounding lands are zoned Agriculture. The Agriculture designation allows many land uses with a land use permit, including energy generation.

Land Use Map

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-1

Study Area B

Study Area B includes approximately 6,300 acres, and the Proposed Project would occupy approximately 4,000 acres (see Figure 2-3). Study Area B is located east of Bitterwater Road and largely north of Highway 58. There are two exclusion areas north of Highway 58—the occupied residence in Section 21 and the electrical substation in Section 27, as described for Study Area A.

The current property owners of the lands under Williamson Act contracts filed notices of nonrenewal with the San Luis Obispo County Planning and Building Department in 2008, and the contracts are set to expire in 2018 (Williamson Act lands are shown on Figure 3-1). In order to remove the lands from Williamson Act contract prior to 2018, the property owners must submit cancellation requests and the County must approve these requests. Cancellation requests can only be approved if the cancellation is consistent with the California Land Conservation Action of 1965 and if the cancellation is in the public interest, per the findings of the Board of Supervisors. The Project Proponent, with consent from the property owners, submitted cancellation requests in 2010. If the cancellation requests are approved, the Proposed Project would be an allowable use on these lands.

All of the land parcels within Study Area B are designated by the general plan as agriculture, with some parcels additionally designated as part of the combining Flood Hazard zone. Carrisa Plains Elementary School is approximately one-half mile south of the southern boundary of Study Area B. As in Study Area A, all land parcels surrounding Study Area B are designated as agriculture except for the school, which is designated as a public facility.

Lands within Study Area B have a similar character to those in Study Area A, and are predominantly actively farmed or fallow agricultural land. The area is mostly flat, with some low, rolling hills with slopes greater than five percent in northern portion of the study area. The study area also includes swales associated with agricultural uses, the 230-kV and 115-kV transmission lines, and several unpaved roads. Figure 3-1 shows the cropped and nonnative grasslands within Study Area B; like Study Area A, none of the lands are irrigated.

Prime and Important Farmlands

A Farmland Conversion Impact Rating Form was submitted to the NRCS on December 13, 2010. This submittal included Parts I and III of the form identifying the numbers of acres affected under each alternative and location maps for the Project. The NRCS returned Parts II, IV, and V of the rating form on January 5, 2011. Because the lands are not irrigated and do not produce crops in seven out of ten years, NRCS determined that Project Site lands do not qualify as prime farmland or farmland of statewide importance under the FPPA (NRCS 2011).

NRCS determined that the majority of Project Site lands are farmlands of local importance. These lands are defined by the California Department of Conservation as "lands of importance to the local economy, as defined by each county's local advisory committee and adopted by its Board of Supervisors. Farmland of local importance is either currently producing, or has the capability of production, but does not meet the criteria of prime farmland, farmland of statewide importance, or unique farmland. Authority to adopt or to recommend changes to the category of farmland of local importance rests with the Board of Supervisors in each county" (California Department of Conservation 2011). The San Luis Obispo County Board of Supervisors defined farmlands of local importance in San Luis Obispo County as follows:

- Local Important (L): areas of soils that meet all the characteristics of prime or statewide, with the exception of irrigation. Additional farmlands include dryland field crops of wheat, barley, oats, and safflower; and
- Local Potential (LP): lands having the potential for farmland, which have prime or statewide characteristics and are not cultivated (California Department of Conservation 2011).

The Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation produces county maps identifying farmland in each county, including prime farmland, unique farmland, farmland of statewide importance, and farmland of local importance. The most recent mapping of San Luis Obispo County was in 2008 (California Department of Conservation 2008); this map identified most Project Site lands as being of local importance or local potential. The NRCS, using FMMP data, mapped 7,671 acres of Study Area A and 6,193 acres of Study Area B as farmland of local importance The NRCS correspondence, maps, and rating forms are included in Appendix C.

Reconductoring

The proposed reconductoring would be undertaken by PG&E along 35 miles of the Morro Bay to Midway 230-kV transmission line, beginning at the point of interconnection for the proposed Topaz Project and terminating at the existing Midway Substation in Kern County. The transmission line right-of-way corridor is between 75 and 128 feet wide, and land along the transmission line corridor is primarily undeveloped. There are two potentially occupied residences within 1,000 feet of the existing transmission line in the Carrizo Plain, and there are an additional 21 potentially occupied residences within 2,000 feet of the existing transmission line in the San Joaquin Valley.

3.2.2 Environmental Impacts

Effects on land use were evaluated within the context of applicable federal, state, and local laws and regulations. The evaluation of potential impacts on land use considered whether the Proposed Action and alternatives would result in any of the following conditions:

- Conflict with any applicable land use plan, policy, or regulation;
- Directly or indirectly divide an established community or disrupt an existing land use; or
- Disrupt recreational opportunities in established federal, state, or local recreation areas.

Proposed Action

Construction of the Proposed Project would be an allowable use under the agricultural zoning designation in San Luis Obispo County, with the approval of a CUP for the facility. In addition, a solar facility in the proposed location would be consistent with the identification of the Carrizo Plain as a high-potential solar resource area in the former energy element of the general plan. As identified in Section C.10 of the Draft EIR for the Topaz Solar Farm Project (San Luis Obispo County 2010a), the Proposed Project would be potentially inconsistent with the following state laws and local regulations, goals, plans, and policies:

- California Land Conservation Act (Williamson Act contracts)– Alternative B only
- California Subdivision Map Act
- Framework for Planning (Inland), Land Use and Circulation Element of the San Luis Obispo General Plan:
  - Planning Principle 1, Policies 1 (Maintain and protect a living environment that is safe, healthful, and pleasant for all residents), 3 (Preserve and sustain important water resources, watersheds, and riparian habitats), and 6 (Encourage the protection and use of agricultural land for the production of food, fiber and other agricultural commodities, and support the rural economy and locally-based agriculture)
  - Planning Principle 2, Policy 2 (Maintain rural areas in agriculture, low-intensity recreation, very low-density residential uses, and open space uses that preserve and enhance a well-defined rural character)
  - Planning Principle 3, Policy 2 (Protect rural areas between communities to achieve well-defined communities within an attractive rural setting)
- Agricultural Element:
  - Goal 2 (Conserve Agricultural Resources)
  - Goal 3 (Protect Agricultural Lands)

- Economic Element:
  - Goal 1 (Promote a strong and viable local economy by pursuing policies that balance economic, environmental, and social needs of the county), Policies 1d (Maintain and protect a living environment that is safe, healthful, and pleasant for all residents), e (Protect open space resources that make San Luis Obispo County an attractive place for economic development), and f (Protect agricultural resources that make San Luis Obispo County an attractive place for economic development)
- Conservation and Open Space Element:
  - Goal BR-2 (Threatened, Rare, Endangered, and Sensitive Species will be protected), Policy BR 2.6 (Ensure that potential adverse impacts on threatened, rare, and endangered species from development are avoided or minimized through Project siting and design. Ensure that proposed development avoids significant disturbance of sensitive natural plant communities that contain special-status plant species or provide critical habitat to special-status animal species. When avoidance is not feasible, require no net loss of sensitive natural plant communities and critical habitat areas)
  - Goal OS-1 (Open Space Resource Protection), Policy 1.7 (Protect open space resources by guiding development away from rural areas to more suitable areas)
  - Goal VR-2 (The natural and historic character and identity of rural areas will be protected), Policy VR-2.1 (Develop in a manner compatible with historic and visual resources: Through the review of proposed development, encourage designs that are compatible with the natural landscape and with recognized historical character, and discourage designs that are clearly out of place with rural areas)
- Land Use Ordinance Title 22:
  - Section 22.10.120 (Noise standards)
  - Section 22.32.060 (Electrical distribution lines on the Project site shall be undergrounded up to the low voltage side of the step-up transformer, to the point of on-site use, or to the utility interface point of an on-site substation) (This is a potential inconsistency if the County determines that the collector lines do not meet this ordinance)

A determination of the significance of the inconsistencies with the general plan would be made by County decision makers in their review and consideration of the Proposed Project, culminating in the decision to grant or deny a permit for the Proposed Project. Conditions of granting a CUP would be expected to include the measures listed in Table 2-9, additional measures to reduce impacts as described in this section and elsewhere in Chapter 3 of this EIS, and perhaps variance of one or more land use ordinances. If a CUP is obtained from the County, potential inconsistencies with the County's general plan would be considered acceptable and the impacts related to consistency with local plans and policies would not be substantial. Specific impacts are discussed under each alternative, below.

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Construction of the solar facility in Study Area A would have direct adverse impacts on residential, agricultural, and Carrisa Plains Elementary School land uses from the proximity of these land uses to construction crews, heavy equipment, construction staging, and increased traffic during construction. The three-year construction process would disrupt land uses for remaining occupied residences, agricultural land uses within and near the study area, and Carrisa Plains Elementary School. Construction of the Proposed Project in Study Area A may also periodically disturb visitors to the Carrizo Plains National Monument, as Soda Lake Road is one of the main entry roads to the monument.

Construction activities would disrupt the rural character of the Project area through the introduction of heavy equipment, delivery trucks, and construction commute traffic, resulting in an intermittent and temporary adverse impact on area residents during the three-year construction period. There are three occupied residences within Study Area A. One of the occupied residences, located in Section 16 of Township 29 South, Range 18 East, may be acquired by the Project Proponent and removed if the Proposed Project includes Project components within that section. The remaining two occupied residences, described above under Project Setting, would remain occupied. These residences are not part of the study area, but would be surrounded by study area lands. The Project Proponent has proposed to establish buffer zones around these residences to reduce the level of impact on the residents. The buffer zones that are proposed are listed in Table 2-2 and shown on Figure 2-2. These buffer zones would reduce but not eliminate temporary adverse impacts resulting from construction of the Proposed Project. Potential construction impacts on area residents from increased dust generation, noise, and traffic are discussed in detail in Sections 3.3, 3.4, and 3.16, respectively.

Implementation of a construction liaison and requirements for noticing of upcoming construction activities will help to reduce the adverse effects of construction through the dissemination of construction information,

establishment of a clear process by which to voice concerns, and timeline for resolution of conflict (see LU-2, LU-3, and LU-4 in Table 2-9).

Operation. Operation of the Proposed Project would result in the discontinuation of agriculture within the study area. It is possible, however, that some agriculture in the form of grazing may occur to control vegetation under the solar arrays. The presence of the solar facility would also alter the rural and agricultural character of the immediate Project area from the presence of PV arrays, fencing, electrical collection equipment, overhead lines, and substation. Project components may serve to divide the rural residential community by placing visual or physical barriers between residences in the form of fenced Project components, though access would be maintained through the retention of the primary road network in and around the study area. In addition, recreation and visitation in the Carrizo Plains National Monument may be adversely affected, as visitors en route to the monument would pass through a more developed environment than currently exists. Potential noise and traffic impacts on area residents from operation of the solar facility would be minor to moderate and are discussed in detail in Sections 3.4 and 3.16, respectively.

Decommissioning. The Proposed Project has an expected lifespan of 30 years, or more with opportunities for equipment replacement. Upon the end of its useful life, the Proposed Project would be deconstructed, and the equipment would be removed from the site and either recycled or disposed in area landfills. Upon removal of the PV equipment, the site would revert to its former rural character, assuming surrounding land uses have remained the same. Any future proposed uses of the land would be subject to County permitting and environment review processes, as applicable.

Study Area A does not include any lands under Williamson Act contracts; therefore, there would be no effect on land uses related to the Williamson Act.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Construction of the Proposed Project in Study Area B would have intermittent, temporary adverse impacts on residential, agricultural, and Carrisa Plains Elementary School land uses similar to those described for Study Area A. The distance of Project facilities from Carrisa Plains Elementary School would increase from one-third to one-half mile under this alternative, lessening potential adverse construction effects in comparison to construction within Study Area A.

Similar to Alternative A, construction activities would temporarily disrupt the rural character of the Project area through the introduction of heavy equipment, delivery trucks, and construction commute traffic during the three-year construction period. The adverse effects from construction would be the same as described under Study Area A on those residences within 1,000 feet of the study area boundary, though there would be fewer residences affected.

There are three occupied residences within Study Area B. The occupied residence in Section 16 of Township 29 South, Range 18 East would be acquired by the Project Proponent and removed if Project components were to be constructed in that section. Residences in Section 21 and Section 18 are expected to remain occupied and these properties would be excluded from the study area boundary (see Figure 2-3). The Project Proponent has proposed to establish buffer zones around these occupied residences to reduce the level of impact on the residents. The buffer zones proposed are listed in Table 2-2 and shown on Figure 2-3. These buffer zones would reduce temporary adverse impacts resulting from construction of the proposed solar facility. Potential construction impacts on area residents from increased dust generation, noise, and traffic are discussed in detail in Sections 3.3, 3.4, and 3.16, respectively.

Measures to appoint a construction liaison and require notices of upcoming construction activities would be the same as described for Alternative A.

Operation. Operational impacts associated with constructing the Proposed Project in Study Area B would be the same as described for Alternative A. These impacts include discontinuation of agriculture within the study area (apart from the potential use of grazing to control vegetation under the PV arrays), the alteration of the rural and agricultural character of the immediate Project area, and the potential division of the rural residential community through the placement of visual or physical barriers in the form of fenced Project components. Compared with Alternative A, visitors en route to the Carrizo Plains National Monument would be less affected because the Proposed Project would occur primarily north of Highway 58 compared with Alternative A. Potential noise and traffic impacts on area residents from operation of the solar facility would be minor to moderate and are discussed in detail in Sections 3.4 and 3.16, respectively.

The study area includes lands under Williamson Act contracts. According to the County's rules for implementing the Williamson Act, electrical generating facilities are not compatible uses on lands under Williamson Act contract. Therefore, to develop the proposed solar facilities on these lands, the contracts must be cancelled or the Project Proponent must wait for the contracts to expire in 2018 before development could begin on these parcels. The Project Proponent, with consent from property owners, submitted cancellation requests in 2010. The Project Proponent will work with the San Luis Obispo County Department of Planning and Building, the County Department of Agriculture, and the California Department of Conservation to obtain cancellation of these Williamson Act contracts (see LU-1 in Table 2-9). Because the Proposed Project could not proceed without resolution of this issue, development on these lands would not conflict with state or county regulations pertaining to the Williamson Act. Mitigation to compensate for loss of lands in the program would be required by the County if it elects to approve a CUP that

includes solar development on these lands; mitigation would likely be at a 1:1 ratio.

Decommissioning. Potential effects from decommissioning would be the same as described for Alternative A.

Prime and Important Farmlands

Under the FPPA, federal agencies must evaluate the suitability of a site for protection as farmland. As discussed in the affected environment section, a Farmland Conversion Impact Rating process was undertaken for the Proposed Project. Parts I and III of the rating form were submitted to NRCS on December 13, 2010. The NRCS returned Parts II, IV, and V of the rating form most recently on January 5, 2011. None of the Project Site was identified as prime and unique farmland or farmland of statewide importance. The form identified 7,671 acres of Study Area A and 6,193 acres of Study Area B as farmland of local importance.

Evaluation of impacts on farmlands is assessed through a rating, or scoring, system. The NRCS assigns a relative value of the farmlands to be converted based on information from soil surveys, NRCS field office technical guides, soil potential ratings or soil productivity ratings, and land capability classifications. Using such sources, NRCS assigns a value between 0 and 100. For the Project Site, the NRCS assigned a score of 71 to Study Area A and a score of 65 to Study Area B. These scores represent the relative value of the farmland to be converted by the Project (in this case, the farmland of local importance). The federal agency then evaluates 12 site assessment criteria, assigning a number to each criterion; the maximum number of points varies for each of the 12 site assessment criterion, with a total score of 160 possible for the 12 criterion. Scoring decisions are made by examining the site, the surrounding area, and the programs and policies of the state or local unit of government in which the site is located. The 12 site assessment criteria were evaluated for Study Area A and Study Area B, and scores of 87 and 108 were assigned to the study areas, respectively. The land evaluation and site assessment scores were totaled, producing a score of 158 points out of a possible 260 points for Study Area A and a score of 173 out of 260 for Study Area B. **Table 3-1**, Farmland Conversion Impact Rating Scores for the Topaz Site, summarizes the scoring for the Topaz site. Appendix C contains details of how points were assigned for each site criterion.

TABLE 3-1
FARMLAND CONVERSION IMPACT RATING SCORES FOR THE TOPAZ SITE

SITE CRITERION	MAXIMUM POINTS	ASSIGNED POINTS - ALTERNATIVE A	ASSIGNED POINTS - ALTERNATIVE B
1. Area in Non-Urban Use	15	15	15
2. Perimeter in Non-Urban	10	9	10
3. Percent of Site Being Farmed	20	20	20
4. Protection Provided by State and Local Government	20	0	20
5. Distance from Urban Built-Up Area	15	15	15
6. Distance to Urban Support Services	15	10	10
7. Size of Present Farm Unit Compared to Average	10	10	10
8. Creation of Non-Farmable Farmland	10	0	0
9. Availability of Farm Support Services	5	2	2
10. On-Farm Investments	20	5	5
11. Effects of Conversion on Farm Support Services	10	1	1
12. Compatibility with Existing Agricultural Use	10	0	0
Total Site Assessment Points	*160*	*87*	*108*
Relative Value of Farmland	*100*	*71*	*65*
Total Points	**260**	**158**	**173**

As contained within 7 USC 658.4(c) of the FPPA, the Department of Agriculture recommends that:

(1) Sites with the highest combined scores are regarded as most suitable for protection and sites with the lowest scores as least suitable.

(2) Sites receiving a total score of less than 160 need not be given further consideration for protection and no additional alternatives need to be evaluated.

(3) Sites receiving scores totaling 160 or more are given increasingly higher levels of consideration for protection.

(4) When making decisions on proposed actions for sites receiving scores totaling 160 or more, federal agency personnel should consider:

i. Use of land that is not farmland or use of existing structures;

ii. Alternative sites, locations, and designs that would serve the proposed purpose but that would convert either fewer acres of farmland or other farmland that has a lower relative value; and

iii. Special siting requirements of the proposed Project and the extent to which an alternative site fails to satisfy the special requirements as well as the originally selected site.

Study Area A received a total score of less than 160; therefore, DOE does not need to give further consideration for protection of these lands, and no additional alternatives need to be evaluated in the EIS.

Study Area B received a total score greater than 160; therefore, DOE needs to give further consideration for protection of these lands. DOE has considered the three factors listed under recommendation (4), above. First, DOE determined that in planning for the Project before applying for a DOE loan guarantee, the Project Proponent thoroughly considered alternative sites as it evaluated the special siting requirements for a PV solar facility. As described in Section 2.1.3, the Project Proponent sought to locate the Project in the Carrizo Plain due to its high solar resource. Based on the size and nature of the Project, the Project Proponent could not achieve the 550-MW output using rooftops or locations closer to city centers. The Project Proponent screened potential feasible sites for the Proposed Project to identify opportunities and constraints for siting. Site-selection screening considered electrical transmission access and available capacity, solar resource potential, and land suitability (availability of disturbed land, flat topography, and low environmental sensitivity).

Based on these criteria, the Project Proponent identified the proposed Project Site defined in Section 2.1.3 as the most suitable for developing its Project because it best met the siting requirements described above, including being located adjacent to a transmission line with available capacity, being in an area recognized as having high solar potential, and being located in an area of disturbed land. Therefore, the Project Proponent selected the proposed site defined in Section 2.1.3 for the Proposed Project.

Second, DOE considered that according to the NRCS, the removal of farmland directly from agricultural production for the proposed Topaz Solar Farm would represent 2.8 (for Study Area A) or 2.3 (for Study Area B) percent of the total available farmland, as defined by the FPPA, within San Luis Obispo County. The lands that would be converted are not irrigated and therefore do not sustain high-yield or high-value crops. Therefore, even with the conversion of this land, adequate farmland remains in San Luis Obispo County to support regional and statewide agricultural needs.

Third, DOE considered that under the decommissioning scenario described in Section 2.3.4, the proposed Project Site could be returned to agricultural uses when the facilities were removed. Therefore, the proposed Topaz Solar Farm would not constitute an irretrievable or irreversible commitment of a resource.

For these reasons, converting the proposed Project Site from an agricultural use to a non-agricultural use would not result in a significant impact on the county's agricultural economy.

Reconductoring

Construction of the PG&E Reconductoring Project is expected to take 20 months to complete. During the 20-month construction period, reconductoring activities would only occur where workers are actively pulling and installing new lines. As such, impacts on land use would be temporary and short term in nature, as the construction crew makes its way along the 35-mile length of transmission line. Impacts would include potential temporary conflict with agricultural and ranching operations. PG&E would work with farmers and ranchers to avoid disturbance during harvest and planting seasons and would provide compensation in the event of damage to crops. PG&E has secured agreements with landowners to access the right-of-way and construct new access roads where necessary, thus minimizing impacts from reconductoring (San Luis Obispo County 2010a).

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee for construction of the Proposed Project. If the facility was not constructed, land uses in the project area would continue as described in Section 3.2.1. There would be no land use impacts under the no action alternative.

3.3 VISUAL RESOURCES

Visual resources include viewsheds and scenic resources. Viewsheds are generally non-managed areas with aesthetic value. A viewshed encompasses the land, vegetation, and other environmental elements that are visible from a fixed vantage point. Scenic resources are considered to be lands that are managed by federal, state, and local governments for preservation and protection purposes. These areas have natural or manmade aesthetic qualities that give a landscape its character and value.

The region of influence for visual resources includes all viewsheds from within the bounds of the Project Site and all points from which the public would be able to view the Proposed Project. For the purposes of this EIS, foreground is defined as less than 0.5 miles from the viewer, middle ground is up to 4 miles from the viewer, and background is distances greater than 4 miles from the viewer to the horizon (USDA, US Forest Service 1995). Visual quality of the Project Site and surrounding area has been determined by the assumption that areas with the most variety in form, line, color, and texture and with the most harmonious composition have the greatest quality and value. This methodology is used by the BLM and is described in Manual H-8410-1 Visual Resource Inventory (BLM 1984). While Project lands are not regulated by this methodology, it is a well-defined system by which to describe visual character.

3.3.1 Affected Environment

Regulatory Framework

There are no federal or state laws or programs applicable to the visual resources at the Project Site. At the local level, the San Luis Obispo County General Plan (2007) includes goals and policies that are meant to maintain certain visual and aesthetic qualities in the county. These are described below.

San Luis Obispo County General Plan

The Framework for Planning (Inland) (2009) includes the following principle and policy:

- Planning Principle 1. Preserve open space, scenic natural beauty, and natural resources. Conserve energy resources. Protect agricultural land and resources.

The Conservation and Open Space Element of the general plan was adopted in May 2010. Chapter 9, Visual Resources, contains the following goals and policies:

- Policy VR 2.1. Develop in a manner compatible with Historical and Visual Resources. Through the review of proposed development, encourage designs that are compatible with the natural landscape and with recognized historical character, and discourage designs that are clearly out of place within rural areas.
- Policy VR 2.2. Site Development and Landscaping Sensitively. Through the review of proposed development, encourage designs that emphasize native vegetation and conform grading to existing natural forms. Encourage abundant native and/or drought-tolerant landscaping that screens buildings and parking lots and blends development with the natural landscape. Consider fire safety in the selection and placement of plant material regarding fire suppression and sensitive plants and habitats.
- Policy VR 2.3. Revise Countywide Design Guidelines. New development should follow Countywide design guidelines to protect rural visual and historical character. The guidelines should encourage new development that is compatible with public views of scenic areas, the natural landscape, and existing development.
- Policy VR 4.1. Designation of Scenic Corridors. Designate scenic corridors based on the recommendations for Scenic Corridor Studies, for the candidate roads and highways. Highway 58 from the Santa Margarita urban reserve line to the Kern County line is listed as a suggested scenic corridor.
- Goal VR 7. Views of the night sky and its constellations of stars will be maintained.

- Policy VR 7.1. Nighttime light pollution. Protect the clarity and visibility of the night sky within communities and rural areas by ensuring that exterior lighting, including streetlight projects, is designed to minimize nighttime light pollution.

Chapter 5, Energy, contains the following strategy and policy for siting commercial solar, wind, and other renewable energy systems:

- Policy E.6.2. Commercial solar and wind power and other renewable energy systems. Encourage and support the development of solar and wind power and other renewable energy systems as commercial energy enterprises.
- Implementation Strategy E 6.2.1. Review of large solar projects. Evaluate large-scale commercial solar projects (i.e., over 10 MW) to favor technologies that maximize the facility's power production and minimize the physical effects of the project. Physical effects include, but are not limited to, noise, area of land disturbance and water use.
- Policy E 6.9. Commercial Renewable Energy Facility Siting. Renewable energy is developed most effectively where sufficient renewable energy resources exist (e.g., solar energy requires a certain amount of sunlight to be efficient and wind energy requires a certain amount of wind.) In areas where renewable energy resources have been identified and mapped pursuant to Policy E 6.8, renewable energy development is dependent on the mapped resource and shall be given high priority while balancing the protection of other environmental resources.

County Code, Title 22, Land Use Ordinances

Title 22 of the County Code contains the following ordinances related to visual resources:

- Section 22.10.080 provides fencing and screening requirements to protect certain uses from intrusion, to protect the public from uses that may be hazardous, and to increase compatibility between different land uses by visual screening.
- Section 22.10.090 establishes height limits in part to support the preservation of neighborhood character and to preserve viewshed and scenic vistas (60-foot limit for unoccupied structures in industrial zones and 35-foot limit in agricultural zones).
- Section 22.10.060 includes requirements for on-site lighting, including the height of fixtures and the prevention of glare and light spillage onto adjacent properties.

- Section 22.32.030, E. Other Requirements. Development standards in addition to those specified in the section and in this chapter may be imposed through conditions of approval where minor use permit or use permit approval is required.
- Section 22.32.060 contains the following relevant requirements:
  - A. Application contents. In addition to the requirements of Section 22.32.020, an application for a photovoltaic generating facility shall describe the tracking system design, shall include showing no concentrated reflections will be directed at occupied structures, recreation areas, or roads; and
  - B. Undergrounding required. Electrical distribution lines on the project site shall be undergrounded up to the low voltage side of the step-up transformer, to the point of on-site use, or to the utility interface point of an on-site substation.

Regional Setting

The Project Site is two miles north of the California Valley and six miles northwest of the Carrizo Plain National Monument. The valley area is characterized by flat land bounded by mountain ranges to the east and west. The Temblor Range, with mountains up to 4,500 feet elevation, lies to the east. The La Panza and Caliente Ranges, with mountains up to 5,000 feet elevation, lie to the west. Rolling foothills lead up to these mountain ranges. Beyond the mountain ranges, the San Joaquin Valley lies to the east, and the Coast Range and Pacific Coast lie to the west.

The Carrizo Plain includes dry-farmed cropland, grasslands, rangelands, and scrubland. Irrigated vineyards and other croplands occur at the northern end of the plain, while much of the southern end of the plain is federal land managed by the Bureau of Land Management, including the national monument lands. The visual qualities for which the monument was designated extend outward to nearby lands, including annual grasslands south of the Project Site. The dominant visual characteristic of the Carrizo Plain is long, unobstructed views over flat grasslands terminating into the foothills and backdropped by the mountain ranges, a feature that contributes to a moderate to high level of visual quality, depending on location.

There are rural residences, transmission lines, paved roads, and structures associated with agriculture dispersed throughout the region. Vegetation in the region is low and has been greatly influenced by agricultural practices. Most of the vegetation is low-growing grasses or cropland. During dry times of the year, generally May to December, the grasses are mostly yellows and browns. Many of the agricultural areas are bare, and soil is exposed. From approximately January to April, the grasses have more shades of green, and many of the

agricultural areas have crops growing. Wildflower displays may occur in the spring and summer, adding points of bright oranges and yellows in large swaths to the valley. There are some small trees interspersed throughout the region but too few to block views in any direction. There is some moderate visual contrast in the valley from these tall, green trees against the low-lying grasslands. The foothills and mountains visible in the middle and background provide visual contrast in color, texture, and line to the grasses and agricultural plots that dominate the valley. The dark colors and rough textures associated with geologic features, vegetation, and shadows on the variable topography of the mountain ranges provide most of the visual contrast in the project area. The bright blue sky also provides contrast to the land and mountains.

Project Setting

The visual character of the Project Site is one that has been modified from its natural state. Modifications include agriculture, rural residential uses, transmission lines and wooden utility poles, paved roads, and ranches. Dry-farming practices include plowing, planting, and harvesting, which produce temporary dust clouds in the vicinity of the Project Site. The Project setting includes a patchwork of plowed bare ground, cover crops, and nonnative grasslands that may vary from year to year.

There are two high-voltage power lines that cross the Project Site in an east-west direction. These lines connect the Morro Bay power plant on the coast to the Midway Substation in Buttonwillow to the east. The transmission lines are supported by steel lattice towers that are dominant vertical elements in the landscape, in addition to smaller wooden utility lines located alongside Highway 58 and local roadways. The steel lattice towers are set back approximately one mile to the north of Highway 58, which also bisects the project area. Other than these structures, there are very few human interventions to the landscape, and the natural, though modified, landscape provides the most visually prominent feature in the project area.

California Valley is a settlement southeast of the Project Site that was established in 1960. The settlement area is largely undeveloped since water and other utility infrastructure required were not available or implemented. There are several occupied residences within the settlement area, and some may have views of the Project Site with two- to three-mile distances.

Two occupied residences within Study Area A and two occupied residences within Study Area B are expected to remain if the Proposed Project is built. These residences would be excluded from but partially or fully surrounded by the study area boundaries. There are additionally approximately 33 occupied residences within one mile of Study Area A and 26 residences within one mile of Study Area B (see Figures 2-2 and 2-3). Many of these residences are along Highway 58, Bitterwater Road, and Soda Lake Road. Carrisa Plains Elementary School is approximately one-third mile from the southern border of Study Area

A and one-half mile from the border of Study Area B. These residences and the school are sensitive visual receptors in the project area. The school is considered to be a moderate sensitive receptor, while the sensitivity level of the residences would vary from low to high based on distance from the Proposed Project and sensitivity of the viewer.

Scenic Resources

Review of the San Luis Obispo County General Plan and Bureau of Land Management Carrizo Plain National Monument Approved Resource Management Plan (BLM 2010b) did not identify any scenic areas or highways in the vicinity of the Project Site. Highway 58 in the vicinity of the Project Site is not an eligible or designated State Scenic Highway. There are no areas of special consideration, such as Natural Areas, Wild and Scenic Rivers, Scenic Roads, or Areas of Critical Environmental Concern, that require protection of scenic resources in the vicinity of the Project Site.

The Carrizo Plain National Monument is a 250,000-acre area that is managed by the Bureau of Land Management. The monument, which is approximately six miles southeast of the Project Site and the closest public land area, would not have views of the Proposed Project due to the distance from and lower elevation of monument lands. However, Highway 58 and Soda Lake Road, which are adjacent to the Project Site, are the primary access roads for the monument, and drivers on these roads are likely to have a higher concern and sensitivity to scenic values.

All public areas or parks that may be used for recreation or camping are more than six miles away from the Project Site boundaries. The Proposed Project will not be visible from public areas and parks used for recreation or camping.

Study Area A

Study Area A consists of rural, agricultural land, some of which is actively farmed and some of which is fallow. The land is primarily flat, with a few small, rolling hills in the southern part of the study area. The Temblor Mountains can be seen in the background to the east of the Project Site. To the west and south, the La Panza and La Caliente Ranges are visible. There are smaller hills and other topographic features in the background as viewed in every direction.

Vegetation in the study area consists of annual grassland and actively farmed land. There are clusters of trees in several parts of the area, but the majority of the study area consists of low-growing green grasses that turn yellow and brown at certain times of the year, generally May to December. Many of the agricultural areas are bare, and soil is exposed. From January to April, the grasses have more shades of green, and some areas have crops growing while fallow areas remain bare earth. Agricultural croplands are visible from Highway 58, Soda Lake Road, and Bitterwater Road; these lands may be bare or cropped,

depending on the agricultural rotation and time of year. Study Area A is slightly more visible from Carrisa Plains Elementary School than Study Area B.

Study Area B

The existing visual resources within Study Area B are similar to those within Study Area A. The land is mostly flat, with some small, rolling hills in the northern portion of the study area. Colors, vegetation, and views of the mountains on all sides are defining features of the study area and are the same as in Study Area A. Study Area B is somewhat more visible from remaining occupied residences than Study Area A, while Study Area A is more visible from Highway 58.

Reconductoring

The existing transmission corridor passes through the northern portion of the Carrizo Plain, crosses the Temblor Range, and traverses the San Joaquin Valley. The dominant visual characteristic of the Carrizo Plain landscape in the vicinity of the existing transmission line is long, unobstructed views across the plain to a mountainous backdrop. The visual character of the Temblor Range in the vicinity of the existing transmission line is that of remote, rolling hills dotted with patchy shrubland vegetation. The visual character of the San Joaquin Valley in the vicinity of the existing transmission line is an extensive valley with an intensive agricultural character (San Luis Obispo County 2010a).

Sensitive receptors include two structures potentially occupied residences within 1,000 feet of the existing transmission line in the Carrizo Plain, and 21 potentially occupied residences within 2,000 feet of the existing transmission line in the San Joaquin Valley. The existing transmission line is within the foreground viewshed of numerous residences and one school in the community of Buttonwillow, at a distance of approximately 1,500 feet. The visual character in the community of Buttonwillow is predominantly industrial, due to the presence of the Midway Substation and the convergence of numerous transmission lines from the surrounding landscape. The transmission line is within 2,000 feet of Highway 58 near the Project Site.

3.3.2 Environmental Impacts

The region of influence for the visual resources analysis includes the area surrounding the Proposed Project from which the public would be able to view the facilities from a fixed vantage point, such as a residence, roadway, or overlook. The existing visual resources and effects from the Proposed Project on visual resources were evaluated using elements from the Bureau of Land Management Visual Resource Management (VRM) system (BLM 1984). While the Proposed Project would occur on lands that are not subject to VRM assessment guidelines, this system offers a method of evaluating the effects of visual change from a project on the surrounding viewscape. The VRM system uses an assessment of the existing visual quality by evaluating elements such as form, line, texture, color, and level of visual sensitivity, and preparation of photographic simulations from key observation points (KOPs). The following

factors, based on the framework provided by the BLM VRM system, were also used to evaluate the visual resources and sensitivity regarding proposed changes in the project vicinity:

- The extent to which the existing landscape is already altered from its natural condition;
- The number of people within visual range of the area, including residents, highway travelers, and those involved in recreational activities; and
- The degree of public interest in or concern about the visual quality of the landscape.

The degree of contrast within viewsheds of the Proposed Project is determined by analyzing the Proposed Project elements with simulated views from identified KOPs. KOPs were identified by their high visibility or sensitivity. They were selected to be representative of the most critical locations from which the Proposed Project would be seen by the public. The degree of visual impact would depend upon the level of visual change coupled with the level of sensitivity of the viewer.

Proposed Action

The Proposed Action would introduce up to approximately 4,100 acres of PV arrays and associated infrastructure to a predominantly undeveloped area. The effect of this change on the visual environment is described below for each alternative. The proposed solar facility would not be visible from the Carrizo Plains National Monument and would therefore have no visual impact on this scenic resource.

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Construction would occur in several phases over a three-year period. A typical workday would last from 7:00 AM to 5:00 PM Monday through Friday. Visual impacts during construction would be varied and changing as the type and location of the construction activities moved across the study area. Initial construction activities would include improving access roads, installing drainage crossings, setting up staging areas, and creating parking areas. The major visual change induced by these activities would be the placement and movement of construction equipment and materials and varying levels of dust creation during earth-disturbing activities. The four staging areas, the closest of which could be 500 feet from Highway 58, within one-third mile of some residences, and almost one-half mile from the elementary school, would include construction offices, a first aid station, worker parking, truck and shuttle loading and unloading areas, and laydown areas for materials. Staging and parking areas would represent a moderate level of visual change over existing conditions for the time in which they were in use.

Requiring a minimum 400-foot setback from Highway 58 and from residences for temporary parking areas and staging laydown areas would minimize the level of visual impact on sensitive receptors in these areas. In addition, restrictions on the type of lighting that could be used in these areas would minimize nighttime ambient light pollution. All staging areas and construction parking areas would be decommissioned upon completion of construction, and PV arrays may be installed in their place.

Access road construction, site grading for building pads, and truck traffic on unpaved, graveled access roads would cause dust to be mobilized in the air, creating dust plumes around these activities similar to those created by some agricultural equipment now used on and around the Project Site. Dust has the potential to be visible over long distances, resulting in a moderate visual impact. Dust control measures implemented in accordance with San Luis Obispo County Air Pollution Control District requirements would reduce the visual impact of dust plumes as viewed by residents and by travelers through the Carrizo Plain (see Air-2 in Table 2-9).

The majority of the construction period would involve installing PV arrays. Since arrays on most of the site would be installed over existing vegetation and would therefore require only minimal site surface preparation, the level of visual impact would be minor to moderate.

Operation. The Proposed Project would increase development in an agricultural area, introducing industrial elements such as PV arrays, a substation, a switching station, a monitoring and maintenance building, a Solar Energy Learning Center, overhead collector line towers, and perimeter fencing. The substation, switching station, and the additional towers to loop the Project into the existing transmission line would be visually consistent with the present transmission line use alongside which these Project structures would be developed. PV arrays and associated collector equipment, including 43-foot-high wood pole collection system supports, would cover approximately six square miles. However, because the Carrizo Plain already contains two prominent high-voltage transmission lines north of Highway 58 that are taller than any Proposed Project components, the introduction of the Project would not disturb the existing intact view of the foothills and mountains in the valley. Thus, the introduction of the Project would represent a moderate visual change over existing conditions.

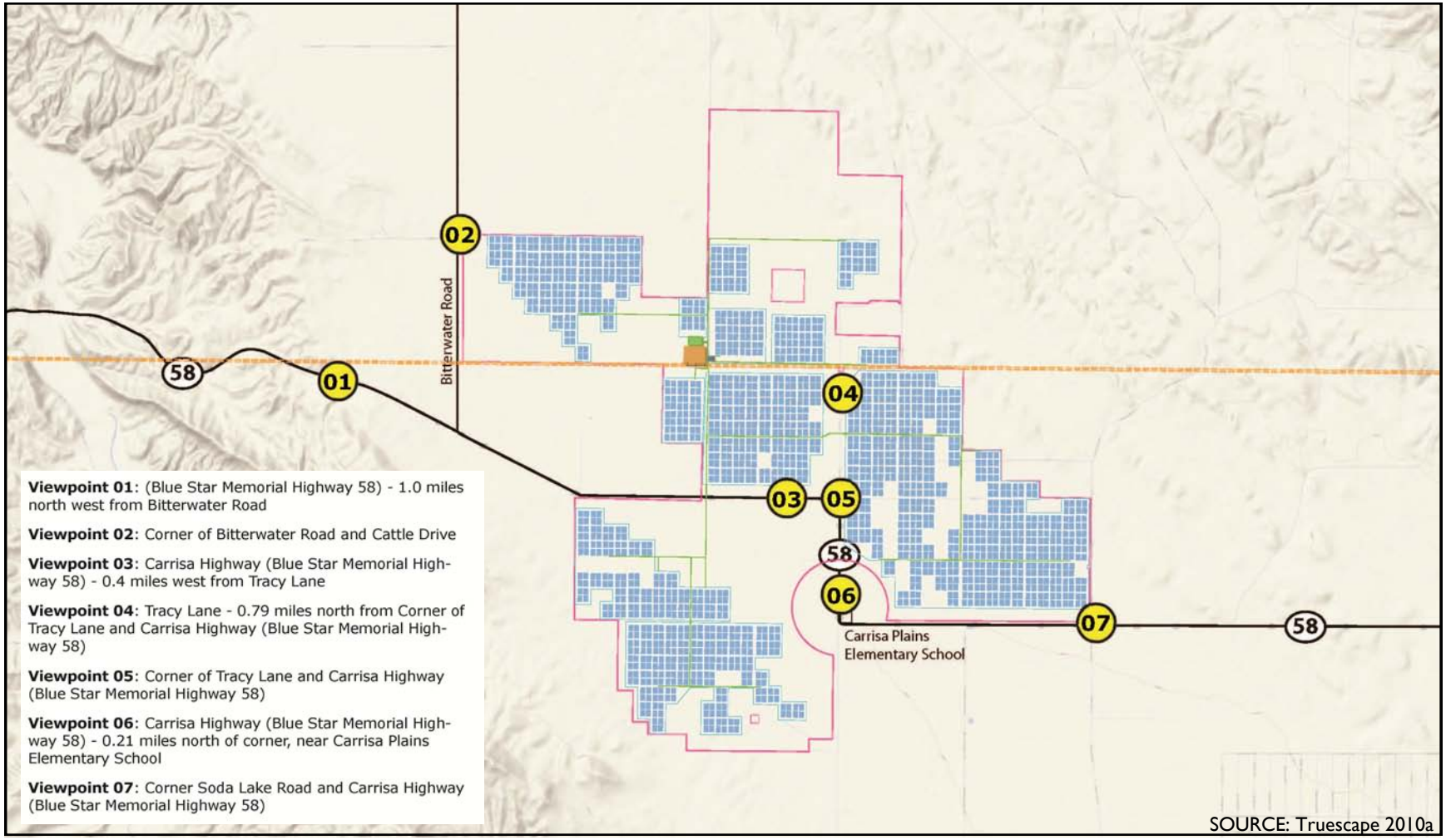
Continuous but generally not prominent views of the Project would be available to drivers traveling east or west on Highway 58. Visibility of the Project would be determined primarily by distance, as the topography is relatively level and there is little terrain or vegetation that interferes with views across the plain in the immediate Project vicinity. Traffic levels in the area are low, but Highway 58 and Soda Lake Road are primary access roads to the Carrizo Plain National Monument. Drivers en route to the monument are likely to have a higher concern and sensitivity to scenic values. To assess the visual impacts of

developing the Project, visual simulations were developed (Truescape 2010a). These simulations depict the views of the Proposed Project under Alternative A, which proposes more PV array development closer to Highway 58 and Soda Lake Road and thus has a higher potential for visual impact than Alternative B.

The methodology used in developing the visual simulations is provided in Appendix D. The visual simulations were verified to accurately represent the primary human field of view of one example configuration of the solar facility when viewed from the surveyed KOPs at the same time of day and reflecting the same conditions as those on the day the photographs were taken (Truescape 2010b). The visual simulations in this EIS address concerns voiced by the County over the visualizations presented in the Draft EIR, including the absence of fencing in the Draft EIR simulations. In addition, the Project Proponent has committed to increase the setbacks along Highway 58 over the original proposed project configurations to address County concerns about the visual impacts on the rural character of the Project Site as viewed from key observation points, primarily area roadways. While the array configurations may change somewhat from those that have been simulated in this EIS based on the final configuration permitted by the County, minimum setbacks from roadways and residences shown in Table 2-2 and included as environmental protection measures in Table 2-9 would be maintained.

Key Observation Point Analysis. KOPs of the proposed Project Site included locations on Highway 58, Bitterwater Road, and Tracy Lane (see **Figure 3-2**, Key Observation Points). The primary location from which the public would view the proposed solar facility would be while travelling east or west on Highway 58, and five of the KOPs modeled are along this road.

KOP 1. KOP 1 is the westernmost location modeled along Highway 58 (**Figure 3-3**, Key Observation Point 1). This KOP shows the existing and simulated views a motorist would see as they enter the plain travelling eastbound on Highway 58, approximately one mile before reaching Bitterwater Road. Because of the high elevation of the plain, the descent along Highway 58 is gradual and does not offer a panoramic view that would be associated with higher lookout points. In the existing view, several transmission lines and associated towers are visible. Mountains are visible in the background, and there are some structures visible in the middle ground. There is some topography to the south. Foreground views are of mostly flat land with low green, yellow, or tan grasses and shrubs, and brown areas of bare, tilled land. In the simulated view, the Proposed Project would be visible in the middle ground to the northeast. The modules would appear as a dark line receding into the horizon or mountain range, and they would be far enough away that they would not be distinguishable. The level of change at this point would be minor.



Visual simulations of a potential Alternative A array configuration were contracted by the Project Proponent. Figures 3-3 through 3-9 depict existing and simulated views of the Project Ste from each of the key observation points (viewpoints) shown here.

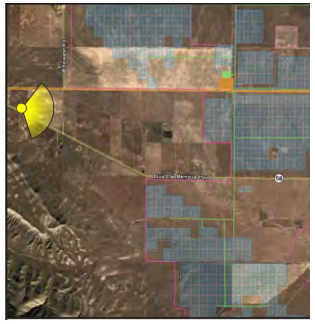
Key Observation Points

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-2

Viewpoint 01: (Blue Star Memorial Highway 58) - 1.0 miles north west from Bitterwater Road - existing

Viewpoint 01: (Blue Star Memorial Highway 58) - 1.0 miles north west from Bitterwater Road - proposed solar farm



SOURCE: Truescape 2010a

Views from KOP 1 would be similar under both alternatives.

Key Observation Point 1

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-3

KOP 2. The next westernmost viewpoint assessed is the intersection of Cattle Drive and Bitterwater Road, looking east along the northern boundary of Study Area A (**Figure 3-4**, Key Observation Point 2). This view is just east of the corner of Bitterwater Road and an unpaved road. There is some agricultural equipment and a transmission line in the foreground, fallow agricultural land with fencing in the middle ground, and mountains in the distant background. The view at this point consists of browns and grays associated with bare ground or yellows, greens and browns associated with agricultural crops, depending on the season. The simulated view shows the Proposed Project visible to the southeast in the foreground. The PV arrays would be somewhat distinguishable in the foreground from this point. This view would most likely affect area residents instead of travelers due to the remote nature of these roads. The level of change from this point would be moderate.

KOP 3. Under Alternative A, the PV arrays would parallel the north side of Highway 58 for up to four miles. KOP 3 is along Highway 58, about 0.4 mile west of Tracy Lane, looking north into the PV array field (**Figure 3-5**, Key Observation Point 3). From this point, the existing view shows transmission lines and fencing visible in the middle and foreground. To the west, mountains are visible in the background. There are some trees in this view. To the south and east from this point, small rolling hills are visible in the background, and vegetation consists primarily of short yellow or green grasses. In the simulated view, PV arrays and associated structures would be visible in the foreground. The Proposed Project would have setbacks of at least 400 feet but would still be distinguishable. In this particular simulation, the PV arrays are shown at a setback of 530 feet from the edge of Highway 58, so the Proposed Project could include arrays up to 130 feet closer to the highway than shown in the simulation. The level of change at this point would be moderate to high.

KOP 4. Tracy Lane runs north to south through the center of the Project Site. KOP 4 is looking northwest from Tracy Lane, approximately 0.8 mile north of the corner of Tracy Lane and Highway 58 (**Figure 3-6**, Key Observation Point 4). From this location there are numerous existing transmission lines visible in the foreground and middle ground. There are also some structures visible in the middle ground and mountains visible in the background to the west. The simulated view shows PV arrays and associated structures visible in the foreground. Views from this road would affect mostly area residents, so the level of change from this point would be considered moderate for the general public and high for area residents.

KOP 5. Highway 58 makes two sharp turns in the center of the project area. KOP 5 is at the northernmost turn, at the intersection of Highway 58 and Tracy Lane (**Figure 3-7**, Key Observation Point 5). The existing view is looking east into Study Area A. The existing viewshed from this point consists of flat land in the foreground and mountains in the background. There are several utility lines

Viewpoint 02: Corner of Bitterwater Road and Cattle Drive - existing

Viewpoint 02: Corner of Bitterwater Road and Cattle Drive - proposed solar farm

SOURCE: Truescape 2010a

KOP 2 shows the view looking east. Views under each alternative would be similar; however, panel development under Alternative B would extend farther to the north than is depicted on this figure.

Key Observation Point 2

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-4

Viewpoint 03: Carrisa Highway (Blue Star Memorial Highway 58) - 0.4 miles west from Tracy Lane - existing

Viewpoint 03: Carrisa Highway (Blue Star Memorial Highway 58) - 0.4 miles west from Tracy Lane - proposed solar farm

SOURCE: Truescape 2010a

Views from this location would be the same under both Alternative A and Alternative B.

Key Observation Point 3

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-5

Viewpoint 04: Tracy Lane - 0.79 miles north from Corner of Tracy Lane and Carrisa Highway (Blue Star Memorial Highway 58) - existing

Viewpoint 04: Tracy Lane - 0.79 miles north from Corner of Tracy Lane and Carrisa Highway (Blue Star Memorial Highway 58) - proposed solar farm

SOURCE: Truescape 2010a

Views from KOP 4 would be similar under Alternative A and Alternative B.

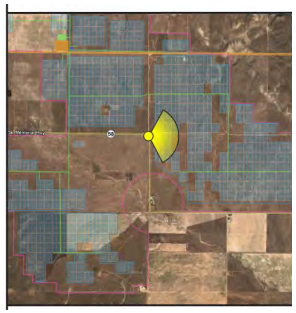
Key Observation Point 4

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-6

Viewpoint 05: Corner of Tracy Lane and Carrisa Highway (Blue Star Memorial Highway 58)- existing

Viewpoint 05: Corner of Tracy Lane and Carrisa Highway (Blue Star Memorial Highway 58) - proposed solar farm



SOURCE: Truescape 2010

The view from this KOP would be similar under Alternative A and Alternative B.

Key Observation Point 5

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-7

and fences in the foreground along the highway. Some structures are visible in the distant middle ground. The simulated view shows PV arrays visible in the foreground at a setback of 409 feet. The Proposed Project would have a minimum setback of 400 feet. Since drivers would slow their speed at this point along Highway 58 and views of the arrays would be straight ahead, the Proposed Project would be more visible here than at other points along the highway. Given the prominence of this viewing location, this would represent a high level of visual change.

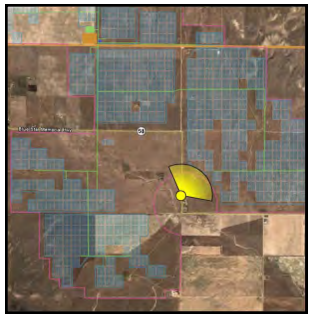
KOP 6. KOP 6 is near the southern sharp turn, 0.21 mile north of the corner near Carrisa Plains Elementary School, looking northeast (**Figure 3-8**, Key Observation Point 6). The existing view shows flat land in the foreground to middle ground and mountains in the background to the east. There is a utility line and fencing in the foreground along the highway. The simulated view shows PV arrays in the near middle ground, visible in all directions. The PV arrays would be set back a minimum of one-third mile from the Elementary School, as they are in this simulation. There would be a moderate level of visual change at this KOP.

KOP 7. The final visual simulation is at the corner of Highway 58 and Soda Lake Road looking northwest (**Figure 3-9**, Key Observation Point 7). This observation point is prominent, as Soda Lake Road is a principle access road to the Carrizo Plain National Monument. The existing view from this point is flat in the foreground and mountainous in the background. There are utility lines and fencing in the foreground. Under Alternative A, proposed PV arrays could be visible in the foreground. The simulation shows a setback of 700 feet north of Highway 58; at this setback, the level of change is moderate. However, the minimum setback being considered as acceptable by the County is 400 feet, which would represent a slightly higher level of visual change, and would be similar to the setback shown from KOP 5, described above.

Implementation of setbacks would reduce the degree of impact as viewed from Highway 58 (see Aes-1 in Table 2-9). In addition, the plain already contains two prominent high-voltage transmission lines and associated transmission towers, which are taller than any Project components. Distribution lines on wooden poles also run along Highway 58 and connect to residences near and within the Project Site. Thus, the Project would not be affecting intact views of the foothills and mountains compared with existing transmission lines, towers, and poles. Nonetheless, introduction of the Project would result in a moderate to high degree of contrast in foreground views to the existing rural, undeveloped nature of the Project Site and to the surrounding landscape near the Project Site. Overall, the Proposed Project would have moderate visual impacts, although highly sensitive persons viewing the facility from nearby locations may experience a higher visual impact.

Viewpoint 06: Carrisa Highway (Blue Star Memorial Highway 58) - 0.21 miles north of corner, near Carrisa Plains Elementary School - existing

Viewpoint 06: Carrisa Highway (Blue Star Memorial Highway 58) - 0.21 miles north of corner, near Carrisa Plains Elementary School- proposed solar farm



SOURCE: Truescape 2010a

The view represented in KOP 6 would apply only to Alternative A. Under Alternative B, panel development would occur one mile farther north than is depicted in this simulation.

Key Observation Point 6

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-8

Viewpoint 07: Corner Soda Lake Road and Carrisa Highway (Blue Star Memorial Highway 58) - existing

Viewpoint 07: Corner Soda Lake Road and Carrisa Highway (Blue Star Memorial Highway 58) - proposed solar farm

SOURCE: Truescape 2010a

The view represented in KOP 7 would apply only to Alternative A. Under Alternative B, no panel development would be visible from this KOP. This simulation shows panels set back 700 feet; however, a setback of 400 feet may be selected pending final decision by the County.

Key Observation Point 7

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-9

In addition to public viewpoints, the Proposed Project would be visible from some area residences, particularly those residences that are fully or partially surrounded by Study Area A. Various setbacks from property lines are described in Table 2-2. These setbacks would provide a buffer zone between residents and the facility. However, the proposed facility may still have a substantial impact on nearby residences from the high degree of visual change in the foreground introduced by the PV arrays and overhead collector lines. The County may require that the Project Proponent develop a visual screening program to offer visual screening such as vegetation or fencing to residents within one mile of the Project boundary. This program would be voluntary, in that residences would elect whether they participated in the program.

No exterior lighting would be installed within the PV arrays or on the Project perimeter. For security and maintenance purposes, shielded lights would be installed at the monitoring and maintenance facility, the substation, the switching station and the Solar Energy Learning Center. Lights located inside each PCS (inverter enclosure) would be turned on by a local switch when infrequent maintenance of the inverter occurs at night. Prohibiting perimeter lighting, installing shielded lights, and keeping PCS lights off when not needed would prevent light impacts on the night sky and nearby residences and sensitive receptors (see Aes-2 in Table 2-9).

Reflection. A reflection study was prepared for the Project to determine the effects of specular solar reflections, or glare, from the PV modules on drivers (First Solar 2010). Specular reflections are mirror-like reflections from smooth surfaces, such as office building windows, water surfaces, and car windows. The study concluded that specular reflections would be seen for minimal amounts of time in the early morning or in the evening when PV modules are located east or west of the observer. Due to the setback of at least 400 feet from Highway 58, the PV modules on the north side of the highway would not result in visible glare to drivers on the highway. PV array development in Study Area A could result in visible reflections from PV arrays located in Sections 27 and 34 that would be apparent to eastbound drivers along Highway 58 for up to four minutes per day between 6:00 AM and 6:30 AM from March to September. For eastbound drivers on Highway 58, the reflections would be seen only when drivers are within approximately 1,600 feet of the arrays in Sections 27 and 34. These reflections could be directly in front of an eastbound driver's viewshed during these time periods, and could potentially cause a distraction to motorists (San Luis Obispo County 2010a). However, a 2002 study on PV reflectivity indicates that the reflections from PV modules would be the same as reflections caused by car windscreens, and would be less reflective than common silver or graphite metallic car paints (Protogeropoulos 2002). In addition, because the PV modules would all be oriented in the same direction and would be flat, there would be only a single reflection from the Project.

These same morning reflections could continue to be visible as the driver traveled north or south on Highway 58 alongside the PV arrays in Section 34. In the evening, there could be reflections briefly visible from the west to drivers traveling alongside PV arrays in Section 33.

An observer traveling on Bitterwater Road at the speed limit alongside Section 19 could see a reflection from the east for about one minute between 6:00 AM and 6:45 AM between March and September. The reflection would be coming from a northeasterly direction and would be more visible to drivers heading north on Bitterwater Road than to drivers heading south (First Solar 2010). The specular reflections visible to drivers heading north or south on Highway 58 or Bitterwater Road during these times would not be in the center of a driver's viewshed and would be mainly in peripheral views.

Decommissioning. The Topaz Solar Farm has an expected lifespan of 30 years or more with opportunity for equipment replacement. The Project would be deconstructed and the equipment would be recycled or disposed in area landfills in accordance with applicable federal and state law. The physical process of deconstructing the Project would have similar short-term adverse effects as those described for construction, both onsite and along haul routes, but would occur over a shorter period of time. When the Project is decommissioned and components are removed, visual impacts resulting from the presence of PV arrays and associated equipment would cease. The project area could revert back to annual grassland after Project operation ceased.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Visual impacts associated with development of the Topaz Solar Farm would be similar to those described under Alternative A. Under Alternative B, PV array development would generally occur farther to the north and would thus be, for the most part, a greater distance away from public vantage points along Highway 58. While the physical changes to the landscape would be the same under this alternative, the viewer sensitivity of the general public would be reduced. Residences in and around Study Area B would be affected to a greater degree than under Alternative A, however, as development would occur closer to or in more directions from their property lines. Alternative B would directly affect one residence each in Section 18, Section 21, and Section 22 (see Figure 2-3).

Construction. Construction activities would result in the same visual changes to the study area as described under Alternative A but would be farther removed from public vantage points along Highway 58 except for a one-mile stretch north of Highway 58 in Section 28. The Project would be located north of Highway 58, except for some arrays in Section 33, which would be south of the highway. Construction would have a moderate level of visual change over existing conditions for the time in which construction activities were taking place. Measures to reduce impacts would be the same as described for Alternative A.

Operation. The Proposed Project would increase development in an agricultural area, introducing industrial elements such as PV arrays, a substation, a switching station, a monitoring and maintenance building, Solar Energy Learning Center, overhead collection system lines supported by wood poles, and perimeter fencing as discussed under Alternative A. The substation, switching station, and the additional towers to loop the Project into the existing transmission line would be in the same location as under Alternative A, and impacts would be the same. PV arrays and associated collector equipment, including 43-foot-high collector line poles, would cover approximately 100 fewer acres than under Alternative A, and because the majority of Project components would be north of Highway 58, Alternative B would represent a moderate to substantial visual impact compared with existing conditions.

Views of the Project would be available to drivers traveling east or west on Highway 58, though mostly at an increased setback when compared to Alternative A. Views from KOPs 1 through 6 would be similar or the same under Alternative B as shown under Alternative A; the captions on Figure 3-3 through 3-7 indicate how the visual simulations apply to Alternative B. KOPs 6 and 7 would not apply to Alternative B, as no PV arrays would be placed in Sections 34 and 35, the two-mile stretch where Highway 58 intersects with Branch Mountain Road and Soda Lake Road. In general, Alternative B would have less of a visual impact when compared with Alternative A but would still represent a substantial change in the character of the landscape over existing conditions.

The PV arrays under Alternative B would be visible from some area residences, particularly those residences that are fully or partially surrounded by Study Area B. Setbacks from the property lines of residents in Sections 18, 21, and 22 are described in Table 2-2. These setbacks would provide a buffer zone between residents and the facility. However, development of the Proposed Project would still have a substantial impact from the high degree of visual change in foreground views introduced by the PV arrays and overhead collector lines. Because Study Area B is farther north, module development could occur both north and south of affected residences instead of just to the south as under Alternative A. Measures to reduce impacts on residences would be the same as described for Alternative A.

Reflection. The reflection study prepared for the Proposed Project also analyzed effects from specular solar reflections, or glare, resulting from PV array development in Study Area B. The study concluded that, similar to Alternative A, specular reflections would be seen for minimal amounts of time in the early morning or in the evening when PV modules are located east or west of the observer. Due to the setback of at least 400 feet from Highway 58, the PV modules on the north side of the highway would not result in visible glare to drivers on the highway. PV modules located in Section 19 could result in visible reflections that would be apparent to drivers traveling the speed limit along

Bitterwater Road for approximately one minute between 6:00 AM and 6:30 AM from March to September (First Solar 2010).

For drivers on Highway 58, the reflections would be seen only when drivers are within approximately 1,600 feet of the arrays. The specular reflections visible to westbound and northbound drivers during these times would not be in the center of a driver's viewshed and would be mainly peripheral views. The reflections could have an intensity similar to those described for Alternative A, which would be similar to the glare from a typical car windscreen (Protogeropoulos 2002). For vehicles on Bitterwater Road, reflections would be 62 feet from the road but would not be visible in the front view of drivers. The reflections would be visible in the periphery to drivers traveling along Bitterwater Road. These reflections would appear during March to September from 6 AM to 6:45 AM for 10-minute periods. The reflections would be in the same direction as the rising or setting sun, and so the reflection would not surprise drivers and would not cause a distraction. These peripheral vision reflections would present a minimal distraction to the safe operation of vehicles and would be similar to driving past a lake or a building with reflective glass (First Solar 2010).

Decommissioning. Impacts from decommissioning of Alternative B would be the same as described under Alternative A.

Reconductoring

Visual impacts during construction would include the temporary establishment of staging areas and the introduction of construction equipment, including heavy trucks, cranes, and helicopters. Construction activities that occurred within the foreground of sensitive receptors would have a short-term minor to moderate impact for the duration of the activity. Earth-disturbing activities could create fugitive dust clouds, which would be controlled through the implementation of standard dust control measures.

Permanent elements of reconductoring would include a microwave reflector, new specular conductor line, a limited number of tower extensions, and a limited number of replacement towers. The microwave reflector, which would be the size of a billboard, would be approximately 1.8 miles north of the existing PG&E transmission line right-of-way corridor. Views of the microwave reflector would be visible in the middle ground distance from Highway 58; therefore, the reflector would be painted to reduce visibility and prevent glare. The new conductor would reflect light and appear shiny to sensitive receptors in the vicinity of the line for the first 18 months after installation. Conductors typically grow dull and lose their reflective quality within 18 months of installation (San Luis Obispo County 2010a).

Reconductoring may increase the height of some of the existing transmission towers from 118 feet to a maximum of 150 feet. This would be a minimal long-term visual change for sensitive receptors with a foreground view of the transmission line; tower modifications would be essentially unnoticeable to viewers at greater distances. Replacement of towers would have a negligible impact, as new towers would be placed in the same or similar location within the existing transmission line corridor. The increased tower heights and replacement of towers would not introduce a new source of structure contrast, industrial character, view blockage, or skylining. Because long-term visual changes would be minimal, long-term visual impacts of reconductoring would be minor.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to the Project Proponent to construct the Proposed Project. The existing visual environment of the Project Site would remain the same.

3.4 AIR QUALITY AND CLIMATE CHANGE

3.4.1 Affected Environment

Ambient air quality is affected by the type and amount of air pollutants emitted into the atmosphere, the size and topography of the air basin, prevailing meteorological conditions, and the conversion of air pollutants and other species by a complex series of chemical and photochemical reactions in the atmosphere. The levels of air pollutants are generally expressed in terms of concentration, either in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The air quality information presented below is the same for Study Area A and Study Area B.

Regulatory Framework

Clean Air Act

The Clean Air Act (CAA) (42 USC §§ 7401−7642) established the principal framework for national, state, and local efforts to protect air quality in the US. Under the CAA, the EPA has set time-averaged standards known as national ambient air quality standards (NAAQS) for six air pollutants considered to be key indicators of air quality: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter (particulate matter with an aerodynamic diameter of 10 microns or less [PM_{10}] and particulate matter with an aerodynamic diameter of 2.5 microns or less [$PM_{2.5}$]). **Table 3-2**, National Ambient Air Quality Standards, lists the NAAQS.

TABLE 3-2
NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

POLLUTANT	PRIMARY STANDARDS		SECONDARY STANDARDS
	AVERAGING TIME	LEVEL	LEVEL
Carbon Monoxide	8-hour	9 ppm (10 mg/m^3)	None
	1-hour	35 ppm (40 mg/m^3)	None
Lead	Rolling 3-Mo. Average	0.15 µg/m^3	Same as Primary
	Quarterly Average	1.5 µg/m^3	Same as Primary
Nitrogen Dioxide	Annual (Arith. Ave.)	53 ppb	Same as Primary
	1-hour	100 ppb	None
Particulate Matter (PM_{10})	24-hour	150 µg/m^3	Same as Primary
Particulate Matter ($PM_{2.5}$)	Annual (Arith. Ave.)	15.0 µg/m^3	Same as Primary
	24-hour	35 µg/m^3	Same as Primary
Ozone[1]	8-hour	0.075 ppm	Same as Primary
Sulfur Dioxide	3-hour	None	0.5 ppm
	1-hour	75 ppb	None

Source: EPA 2010a
[1]On January 6, 2010, EPA proposed to revise the 8-hour ozone primary standard to between 60 and 70 ppb; final rule on this proposal is pending.

A NAAQS is composed of two parts–an allowable concentration of a criteria pollutant and an averaging time over which the concentration is to be measured. Averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposure to a high concentration for a short time or to a lower average concentration over a longer period. For some pollutants, there is more than one air quality standard, reflecting both short-term and long-term effects. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The CAA also regulates toxic air pollutants, or hazardous air pollutants, that are known or suspected to cause cancer or other serious health effects or adverse Environmental Impacts. EPA has issued rules covering 80 categories of major industrial sources, as well as categories of smaller sources. PV generating facilities are not included in the list of categories.

Clean Air Act Conformity Requirements

Section 176(c) of the CAA requires that federal actions conform to the appropriate State Implementation Plan. A State Implementation Plan is a plan developed at the state level that provides for the implementation, maintenance, and enforcement of NAAQS and is enforceable by the EPA. The EPA has promulgated rules establishing conformity analysis procedures for transportation-related actions and for other general federal agency actions (40

CFR Parts 6, 51, and 93). The EPA general conformity rule requires preparation of a formal conformity determination document for federal agency actions that are undertaken, approved, or funded in federal nonattainment or maintenance areas when the total net change in direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. Because the Project Site is not located in a nonattainment area, the Proposed Action is exempt from the CAA general conformity rule. The portion of the PG&E Reconductoring Project in Kern County is in a federal nonattainment area; CAA conformity thresholds for Kern County are discussed under *Reconductoring* at the end of this section.

Prevention of Significant Deterioration (PSD)

As an attainment area, San Luis Obispo County is classified as a Class II area under CAA Prevention of Significant Deterioration guidelines. Air quality control regions are classified either as Class I, II, or III to indicate the degree of air quality deterioration that the state or federal government will allow while not exceeding national ambient air quality standards (though no Class III areas have been designated). As a Class II area, a moderate change in air quality due to industrial growth while still maintaining air quality that meets the NAAQS would be allowed. Class I areas are special areas of natural wonder and scenic beauty, such as national parks, national monuments, and wilderness areas, where air quality should be given special protection. Class I areas are subject to maximum limits on air quality degradation. There is one Class I area within 100 kilometers of the Project Site; the San Rafael Wilderness is located approximately 50 kilometers southwest of the Project Site.

PSD requires major sources or major modification of sources to obtain permits for attainment pollutants. The Proposed Project is a new source that does not have a rule-listed emissions source; therefore, the PSD trigger levels are 250 tons per year for each criteria pollutant; this limit applies only to Project operation.

Regional Air Quality

Based on measured ambient criteria air pollutant concentrations, the EPA classifies areas of the US according to whether they meet the NAAQS. Areas that violate air quality standards are designated as nonattainment areas for the relevant criteria air pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe-15, severe-17, and extreme for ozone, and moderate and serious for carbon monoxide and PM_{10}). Areas that comply with air quality standards are designated as attainment areas for the relevant criteria air pollutants. Areas that have been redesignated from nonattainment to attainment are considered maintenance areas. Areas of uncertain status are generally designated as unclassifiable but are treated as attainment areas for regulatory purposes. San Luis Obispo County is either unclassified or attainment for all of the NAAQS.

The San Luis Obispo County Air Pollution Control District (APCD) administers air quality programs in the county. The APCD operates eight monitoring stations throughout the county. The nearest monitoring station to the Project Site, located one-third mile away on the Carrisa Plains Elementary School property, monitors ozone with an objective of assessing general background ozone levels and ozone transport levels (ozone that originates outside the APCD boundaries). This station reported exceedances[1] of the federal (2008) 8-hour ozone standard in the last three years for which monitoring data are available (2007 to 2009). The NAAQS was exceeded 9, 22, and 3 times in those years, respectively (the 2008 exceedance level was high due to extreme wildfire activity in Santa Barbara County in June and July of that year). The Atascadero-Lewis Avenue monitoring station, located approximately 40 miles northwest of the Project Site, measures PM_{10} and $PM_{2.5}$, while the Higuera Street station in the City of San Luis Obispo measures carbon monoxide. The $PM_{2.5}$ standard was exceeded twice at the Atascadero-Lewis Avenue in 2009; no other exceedances of any NAAQS were recorded at those monitoring stations from 2007 through 2009 (CARB 2010).

Emissions associated with current activities on the Project Site include fugitive dust emissions from agricultural activities, travel on unpaved roadways, and emissions associated with farm equipment and vehicles.

Greenhouse Gases and Climate Change

Greenhouse gases are chemical compounds in the Earth's atmosphere that allow incoming short-wave solar radiation but absorb long-wave infrared radiation re-emitted from the Earth's surface, trapping heat. Most studies indicate that the Earth's climate has warmed over the past century due to increased emissions of greenhouse gases, and that human activities affecting emissions to the atmosphere are likely an important contributing factor.

Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, carbon dioxide, methane, and nitrous oxide are examples of greenhouse gases that have both natural and manmade sources, while other greenhouse gases such as chlorofluorocarbons are exclusively manmade. In the US, most greenhouse gas emissions are attributed to energy use. Such emissions result from combustion of fossil fuels used for electricity generation, transportation, industry, heating, and other needs. Energy-related carbon dioxide emissions represent 82 percent of total manmade greenhouse gas emissions in the US (US Energy Information Administration 2009).

Computer-based modeling suggests that rising greenhouse gas concentrations generally produce an increase in the average temperature of the Earth, which may produce changes in sea levels, rainfall patterns, and intensity and frequency

[1] Exceedances of standards does not necessarily result in a violation of the NAAQS due to how NAAQS are defined.

of extreme weather events. Collectively, these effects are referred to as "climate change." The Intergovernmental Panel on Climate Change, in its Fourth Assessment Report, stated that warming of the earth's climate system is unequivocal, and that warming is very likely due to anthropogenic greenhouse gas concentrations (Intergovernmental Panel on Climate Change 2007).

The Project Site generates low levels of greenhouse gas emissions, primarily associated with vehicles and farm equipment.

Reconductoring

The PG&E Reconductoring Project would occur within San Luis Obispo and Kern Counties. Eleven miles of the transmission line are within San Luis Obispo County, and twenty-four miles of the line are within Kern County; both switching stations would be within San Luis Obispo County. As mentioned above, San Luis Obispo County is in attainment or is unclassified for all of the NAAQS, while the western portion of Kern County is an extreme nonattainment area for the federal ozone standard and a nonattainment area for the federal $PM_{2.5}$ standard. CAA conformity thresholds applicable to western Kern County are 10 tons per year for ozone precursor emissions and 100 tons per year for direct $PM_{2.5}$ emissions.

Sensitive receptors along the transmission line route include potentially occupied residences and two schools, the Carrizo Plains Elementary School and Buttonwillow Union Elementary School in the community of Buttonwillow.

3.4.2 Environmental Impacts

Air quality impacts would be considered substantial if the Proposed Project resulted in any of the following:

- Emissions would exceed CAA conformity thresholds (for reconductoring in Kern County);
- Operational emissions would exceed Prevention of Significant Deterioration permit applicability thresholds for federal attainment pollutants;
- The project would cause air quality impacts in exceedance of the NAAQS; or
- The project would be inconsistent with any adopted air quality plans or policies.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Construction would be the greatest potential source of emissions under the Proposed Action. The primary sources of air pollutant emissions would be exhaust emissions associated with construction equipment, exhaust emissions associated with commute vehicles and delivery trucks, and fugitive

dust emissions from vegetation clearing and site grading. Construction activities would be staggered, such that different activities would occur on different areas of the Project Site over the three years of construction.

Table 3-3, Unmitigated Construction Emissions, Alternative A, presents conservatively modeled estimates of annual construction emissions as well as the total construction emissions over the three-year construction period. Actual emissions, particularly fugitive dust emissions, are expected to be lower with the implementation of fugitive dust control measures and because of reduced grading requirements than was modeled. Emissions would occur during the construction period only and therefore would be short term and temporary.

TABLE 3-3
UNMITIGATED CONSTRUCTION EMISSIONS, ALTERNATIVE A (TONS PER YEAR)

CONSTRUCTION ACTIVITY, UNMITIGATED	ROG	NO_x	PM_{10} (EXHAUST)	PM_{10} (DUST)	CO	SO_2
Fugitive Dust	—	—	—	205.84	—	—
Off-Road Equipment Exhaust	14.28	98.64	4.6	0.04	50.6	0.04
On-Road Diesel Exhaust	3	43.32	1.36	0.36	28.84	0.08
On-Road Other Vehicles	1	2.84	0.08	0.2	34.76	0.04
Annual Construction Emissions	18.28	144.8	6.04	206.4	114.2	0.12
Total Construction Emissions (3 years)	54.82	434.36	18.10	619.16	342.6	0.36

Notes:
ROG – reactive organic gases; NO_x – nitrogen oxides; CO – carbon Monoxide; SO_2 – sulfur oxides
Emissions were derived from the Draft EIR air quality analysis (San Luis Obispo County 2010a). Emissions in the EIR were calculated using the URBEMIS2007, version 9.2.4 computer model (http://www.urbemis.com/), which incorporates emission factors established by the California Air Resources Board as part of the OFFROAD2007 and EMFAC2007 mobile source emission models. The URBEMIS assessment used a 'general light industrial' land use type of 640 acres and 1,640 acres for Alternative A and Alternative B, respectively, representing the area that may be graded.
URBEMIS is an air quality emissions model that contains California-specific inputs and is widely used throughout the state to calculate construction and operational emissions from land use projects.
Total construction emissions were averaged across three years.

In addition to the emissions shown on Table 3-3, minor emissions of toxic air pollutants would occur during vehicle and equipment combustion processes and from minor solvent and coating use.

As shown in Table 3-3, fugitive dust would be the primary source of emissions during Project construction. Dust control would be provided in accordance with San Luis Obispo County Air Pollution Control District (APCD) requirements during Project construction. As part of the Construction Activity Management Plan, a Dust Control Management Plan would be prepared that documents best management practices and other measures that must be implemented during construction to reduce fugitive dust emissions. Exact

measures will be developed prior to permitting, but examples of dust control measures that could be employed include the following:

- Reduce the amount of the disturbed area where possible;
- Use water trucks or sprinkler systems in sufficient quantities to prevent airborne dust from leaving the site. Increase watering frequency whenever wind speeds exceed 15 mph;
- Spray all dirt stock pile areas daily as needed;
- Implement permanent dust control measures identified in the approved Project revegetation plan as soon as possible following completion of any soil-disturbing activities;
- Sow exposed ground areas that are planned to be reworked at dates greater than one month after initial grading with a fast germinating, non-invasive grass seed and water until vegetation is established;
- Stabilize all disturbed soil areas not subject to revegetation using approved chemical soil binders, jute netting, or other methods approved in advance by the APCD;
- Prohibit vehicle speeds over 15 mph on any unpaved surface at the construction site;
- Cover or maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) on all trucks hauling dirt, sand, soil, or other loose materials;
- Install wheel washers where vehicles enter and exit unpaved roads onto streets, or wash off trucks and equipment leaving the site;
- Sweep streets at the end of each day if visible soil material is carried onto adjacent paved roads;
- Include fugitive dust mitigation measures on grading and building plans;
- Designate a person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize dust complaints, reduce visible emissions below 20 percent opacity, and to prevent transport of dust offsite.

Regional air quality management plans account for a certain level of emissions per activity per year. The proposed Topaz Solar Farm would comprise a portion of the 1,160 tons per year of PM_{10} planned for construction and demolition in the reference year emissions inventory of the San Luis Obispo County Clean Air Plan (SLO APCD 2001). By implementing mitigation fully consistent with current APCD guidelines, the mitigated construction activities would be undertaken in a manner consistent with the Clean Air Plan.

In addition to fugitive dust control, the Project Proponent would implement measures to reduce emissions associated with construction equipment on the Project Site. Exact measures will be documented in the Construction Activity Management Plan but could include some or all of the following:

- Maintain all construction equipment in proper tune according to manufacturer's specifications;
- Fuel all off-road and portable diesel powered equipment with California Air Resources Board-certified motor vehicle diesel fuel;
- Use diesel construction equipment that meet California Air Resources Board Tier 2 certified engines or cleaner off-road heavy-duty diesel engines and that comply with the State On-Road Regulation;
- Use on-road heavy-duty trucks that meet the California Air Resources Board 2007 or cleaner certification standard for on-road heavy-duty diesel engines and that comply with the State On-Road Regulation;
- Construction or trucking companies with fleets that that do not have engines in their fleet that meet the engine standards identified in the above two measures (e.g., captive or NOx exempt area fleets) may be eligible by providing alternative compliance;
- Prohibit all on- and off-road diesel equipment from idling for more than five minutes. Post signs in the designated queuing areas and on job sites to remind drivers and operators of the five-minute idling limit;
- Prohibit diesel idling within 1,000 feet of sensitive receptors (residences and schools);
- Do not locate staging and queuing areas within 1,000 feet of sensitive receptors;
- Use electric equipment when feasible;
- Substitute gasoline-powered equipment for diesel-powered equipment, where feasible; and
- Use alternatively fueled construction equipment on-site where feasible, such as compressed natural gas, liquefied natural gas, propane, or biodiesel.

Operation. Operation of the proposed Topaz Solar Farm would result in no emissions of criteria air pollutants or greenhouse gases from operation of the solar generating equipment itself, including the PV modules, inverters, switchgear, transformers, gen-tie line, substation, and conductors. Operation of the facility would result in minor emissions from personal and maintenance vehicles, limited delivery trucks, and limited equipment exhaust, as well as

fugitive dust emissions from windborne dust and dust generated by vehicles on unpaved surfaces. **Table 3-4**, Operational Emissions, presents full build-out emissions associated with the 15 maintenance workers, on-site vehicle travel, delivery trucks, and fugitive dust from travel on unpaved roadways. In addition to the emissions shown on Table 3-4, minor emissions of toxic air pollutants would occur from vehicle and equipment use and from any minor solvent and coating use associated with maintenance of equipment and upkeep of buildings. Emissions shown in Table 3-4 would displace some or all of the emissions currently generated on the Project Site by agricultural activities.

TABLE 3-4
OPERATIONAL EMISSIONS (TONS PER YEAR), ALTERNATIVES A AND B

CONSTRUCTION ACTIVITY, UNMITIGATED	ROG	NO_x	PM_{10} (EXHAUST)	PM_{10} (FUGITIVE)	CO	SOx
Vehicles and On-Road Dust	1.99	0.82	0.18	0.93	6.23	0
Off-Road Dust	—	—	—	11.09	—	—
Annual Emissions (tons per year)	1.99	0.82	0.18	12.02	6.23	0
Total Emissions (30 years)	59.7	24.6	5.5	360.6	186.9	0

Notes:
ROG – reactive organic gases; NO_x – nitrogen oxides; CO – carbon Monoxide; SO_2 – sulfur oxides
Emissions were derived from the Draft EIR air quality analysis (San Luis Obispo County 2010a). Emissions in the EIR were calculated using the URBEMIS2007, version 9.2.4 computer model (http://www.urbemis.com)

Similar to construction, an Operational Dust Control Plan would be developed to minimize fugitive dust. Measures could include but are not limited to the following:

- Establish and maintain a crust on the soil surface using water or dust palliative;
- Use engineered surfaces or gravel for on-site roadways;
- Avoid disturbance of the established crust by vehicle or foot traffic; and
- Limit the speed of maintenance vehicles to under 15 miles per hour.

Under Prevention of Significant Deterioration regulations, emissions below annual threshold levels are considered to not have an adverse effect on Class I areas. Because operational emissions under Alternative A would be well below the 250-ton per year threshold, the Proposed Project would not have an adverse effect on the San Rafael Wilderness Class I area.

Decommissioning. Air quality impacts from decommissioning the solar facility would be similar to but less than those from construction. Measures to reduce impacts would likely be required by the County to minimize fugitive dust and

exhaust emissions; these measures would be similar to the measures described above for construction.

The Proposed Project under Alternative A would not result in a violation of the NAAQS or PSD thresholds. The Project would be consistent with applicable plans with the implementation of measures to control reduce dust and minimize exhaust-related emissions.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Air quality impacts under Alternative B would be similar to those described for Alternative A. **Table 3-5**, Unmitigated Construction Emissions, Alternative B, shows a conservative estimate of emissions. As discussed for Alternative A, actual emissions, particularly fugitive dust emissions, are expected to be much lower because of reduced grading requirements than what is conservatively modeled and with the implementation of fugitive dust control measures. Emissions would occur during the construction period only and therefore would be short term and temporary.

TABLE 3-5
UNMITIGATED CONSTRUCTION EMISSIONS, ALTERNATIVE B (TONS PER YEAR)

CONSTRUCTION ACTIVITY, UNMITIGATED	ROG	NO_x	PM_{10} (EXHAUST)	PM_{10} (DUST)	CO	SO_2
Fugitive Dust	—	—	—	510.52	—	—
Off-Road Equipment Exhaust	14.28	98.64	4.6	0.04	50.6	0.04
On-Road Diesel Exhaust	7.6	109.88	3.44	0.92	73.6	0.24
On-Road Other Vehicles	1.8	5.04	0.16	0.32	61.84	0.04
Annual Construction Emissions	23.67	213.55	8.18	511.76	186.05	0.28
Total Construction Emissions (3 years)	71.03	640.65	24.55	1,535.29	558.14	0.85

Notes:

Emissions were derived from the Draft EIR air quality analysis (San Luis Obispo County 2010a). Emissions in the EIR were calculated using the URBEMIS2007, version 9.2.4 computer model (http://www.urbemis.com/), which incorporates emission factors established by the California Air Resources Board as part of the OFFROAD2007 and EMFAC2007 mobile source emission models. The URBEMIS assessment used a 'general light industrial' land use type of 640 acres and 1,640 acres for Alternative A and Alternative B, respectively, representing the area that may be graded.

Total construction emissions were averaged across three years.

Measures to reduce fugitive dust and equipment exhaust emissions would be the same as those described for Alternative A.

Operation. Operational air quality impacts would be the same as those described for Alternative A.

Decommissioning. Air quality impacts from decommissioning would be the same as those described for Alternative A.

The Proposed Project under Alternative B would not result in a violation of the NAAQS or PSD thresholds. The Project would be consistent with applicable plans with the implementation of measures to control reduce dust and minimize exhaust-related emissions.

Greenhouse Gases and Climate Change

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change stated that warming of Earth's climate system is unequivocal, and that warming is very likely due to anthropogenic greenhouse gas concentrations (Intergovernmental Panel on Climate Change 2007). DOE is not aware of any methods to correlate exclusively the carbon dioxide emissions resulting from the Proposed Project to any specific impact on global warming; however, studies such as the Intergovernmental Panel on Climate Change report support the premise that carbon dioxide emissions from the Project, together with global greenhouse gas emissions, would likely result in a cumulative impact on global warming. Although the Project would contribute incrementally to greenhouse gas emissions and climate change, greenhouse gas emissions would be limited to one-time construction emissions and minimal annual emissions from operation of the facility. These operational emissions would be associated with commute vehicles, on-site maintenance vehicles and equipment, and delivery trucks. No generators or pumps would be used during operations.

A greenhouse gas technical report was contracted by the Project Proponent to analyze emissions associated with construction and operation of the Proposed Project (Environ 2010). These emissions are shown in **Table 3-6**, Project Greenhouse Gas Emissions.

PV panels generate electricity without producing carbon emissions. The Proposed Project would generate over 1 million MWh of electricity annually, or over 30 MWh over 30 years. By potentially displacing natural gas and other fossil fuels used to produce electricity, PV installations reduce generation of CO_2 and other greenhouse gases. Energy produced in PG&E's service area includes a mix of nuclear (20.5 percent), hydroelectric (13 percent), and renewable energy sources (14.4 percent), along with natural gas (34.6 percent), coal (1.3 percent), other fossil-based resources (1.2 percent), and unspecified sources (15 percent) (PG&E 2009). Displacement of PG&E-delivered electricity with Project-generated electricity would reduce GHG emissions by 288,475 tonnes annually, or 8,654,250 tonnes over the life of the Project (Environ 2010).

Deducting annualized emissions from construction and annual operational emissions, the Proposed Project would reduce GHG emissions by 285,493 tonnes annually, or 8,564,790 tonnes over the life of the Project.

Operation of the Proposed Project would therefore represent a potential beneficial impact by reducing greenhouse gas emissions and helping to prevent or mitigate adverse effects of climate change. The Project would also help meet California's Renewable Portfolio Standard, as described in Section 1.3.1.

TABLE 3-6
PROJECT GREENHOUSE GAS EMISSIONS, ALTERNATIVES A AND B

SOURCE	TOTAL EMISSIONS (TONNES[3] CO_2E)
Construction Greenhouse Gas Emissions	
Vegetation (release of carbon sequestered; one time removal)	11,439
Construction Equipment On-Road	30,998
Construction Equipment Off-Road	2,608
Worker Commutes	4,402
Vendor Commutes/Construction Equipment Delivery	24, 615
Demolition Hauling	11
Water Supply	42
Lighting	6
Total Greenhouse Gas Emissions from Construction	*74,505*
Operational Greenhouse Gas Emissions	
Buildings[1]	65
Worker Commute and Vendor Trips	425
Visitor Trips	47
Water [1]	3
Lighting[1]	7
Area[2]	32
Existing Site Emissions	-82
Total Annual Greenhouse Gas Emissions from Operation	*498*
Total Annualized Emissions (construction/30 years + operations)	2,982

Source: Environ 2010
[1]Emissions associated with production of energy for electricity usage.
[2]Emissions from vegetation management equipment
[3]The standard reporting unit for greenhouse gases is metric tons, or tonnes. 1 tonne = 1.1 ton.

Reconductoring

Reconductoring would result in temporary, short-term emissions associated with construction activities. The primary sources of air pollutant emissions would be exhaust emissions associated with construction equipment, exhaust emissions associated with commute vehicles and delivery trucks, and minor fugitive dust emissions from any ground-disturbing actions. Construction emissions calculated by county are shown in **Table 3-7**, Construction Emissions by County.

TABLE 3-7
CONSTRUCTION EMISSIONS BY COUNTY, PG&E RECONDUCTORING PROJECT (TONS PER YEAR)

CONSTRUCTION ACTIVITY	ROG	NO_x	PM_{10} (EXHAUST)	PM_{10} (DUST)	$PM_{2.5}$	CO	SO_x
San Luis Obispo County (2011)	0.97	6.77	0.22	1.36	0.46	6.9	0.0
Kern County (2011)	0.4	1.68	0.02	3.24	0.68	2.59	0.0
San Luis Obispo County (2012)	0.46	4.84	0.17	0.78	0.29	3.76	0.0
Kern County (2012)	1.07	4.4	0.06	0.02	0.0	4.42	0.0

Source: San Luis Obispo County 2010a, Appendix 4

Potential adverse impacts would be minimized through measures such as those described for construction of the Proposed Topaz Solar Farm Project.

Operation of the reconductored line itself would generate no criteria pollutant or toxic air contaminant emissions. Minor emissions from vehicles used for routine maintenance and repair would occur. Emissions associated with construction and operation would be well below CAA conformity thresholds for activities occurring within Kern County.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee and the Project would not be constructed. No change in existing air emissions would occur. Potential beneficial impacts on global climate change described under the Proposed Action would not be realized.

3.5 NOISE

3.5.1 Affected Environment

Noise is defined as unwanted sound and can be intermittent or continuous, steady or impulsive. The decibel (dB) is the accepted unit of measurement for noise. Human response to noise is extremely diverse and varies according to the type of noise source, the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source and the receptor. The sensitivity of the human ear to sounds of different frequencies is measured by the A-weighted decibel scale (dBA). The smallest change in noise level that a human ear can perceive is about 3 dBA, increases of 5 dBA or more are clearly noticeable, and a 10 dBA change in noise levels is judged by most people as a doubling of sound level. **Table 3-8**, Example Noise Levels, describes the noise levels of some familiar sources.

In general, sound waves travel away from the noise source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source. A doubling of distance results in an approximately 6-dB reduction in sound pressure level for

single point sources of noise and a 3-dB reduction in sound pressure level for multiple point sources moving in a straight line such as a highway (Hedge 2011).

TABLE 3-8
EXAMPLE NOISE LEVELS

CHARACTERIZATION	dBA	EXAMPLE NOISE CONDITION OR EVENT
Threshold of pain	130	Surface detonation, 30 pounds of TNT at 1,000 feet
	125	F/A-18 aircraft takeoff with afterburner at 470 feet
Possible building damage	120	Mach 1.1 sonic boom under aircraft at 12,000 feet
	115	F/A-18 aircraft takeoff with afterburner at 1,600 feet
	110	Peak crowd noise, pro football game, open stadium
	105	Emergency vehicle siren at 50 feet
	100	F/A-18 aircraft departure climbout at 2,400 feet
Extremely noisy	95	Locomotive horn at 100 feet
8-hour workplace limit	90	Heavy truck, 35 mph at 20 feet; Leaf blower at 5 feet
Very noisy	85	Power lawn mower at 5 feet; City bus at 30 feet
	80	2-Axle commercial truck, 35 mph at 20 feet
Noisy	75	Street sweeper at 30 feet; Idling locomotive, 50 feet
	70	Auto, 35 mph at 20 feet; 300 feet from busy 6-lane freeway
Moderately noisy	65	Typical daytime busy downtown background conditions
	60	Typical daytime urban mixed use area conditions
	55	Typical urban residential area away from major streets
	50	Typical daytime suburban background conditions
Quiet	45	Typical rural area daytime background conditions
	40	Quiet suburban area at night
Very quiet	30	Quiet rural area, winter night, no wind
	20	Empty recording studio
Barely audible	10	Audiometric testing booth
Threshold of Hearing	0	---

Source: Compiled from Beranek 1988

Regulatory Framework

Occupational Safety and Health Act of 1970, 29 USC §§ 651, et seq.
The Occupational Safety and Health Act of 1970 created the Occupational Safety and Health Administration (OSHA) under the US Department of Labor. OSHA ensures safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education, and assistance. OSHA has adopted federal regulations to implement the act that are contained in 29 CFR, including those designed to protect workers against effects of noise exposure. Employers must ensure that working conditions comply with OSHA permissible noise exposure standards and that

safety measures, including hearing protection, are provided in compliance with OSHA regulations.

California Code of Regulations, Title 8, §§ 5095–5099
State regulations concerning worker noise exposure are contained in the California Code of Regulations, Title 8, §§ 5095–5099 and are managed by the California Occupational Safety and Health Administration (CalOSHA). These standards are the state version of the federal OSHA standards contained in 29 CFR. Where CalOSHA standards are more stringent than federal OSHA standards, the more stringent standards apply for projects occurring in California.

California Government Code § 65302
California law encourages local governmental entities to incorporate and implement a noise element as part of their general plan. The Governor's Office of Planning and Research has developed guidelines for preparing noise elements, including establishing land use compatibility guidelines for noise exposure. These guidelines include normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable noise levels for different land use categories.

San Luis Obispo County General Plan Noise Element
The noise element of the County general plan presents policies for minimizing future noise impacts associated with land use development in the county. Policy 3.3.5(b) limits noise from new proposed stationary noise sources to the noise level standards shown in **Table 3-9**, Maximum Allowable Noise Exposure from Stationary Sources, at the property line of existing noise-sensitive land uses. Noise-sensitive land uses near the Project Site are described below under General Project Area.

TABLE 3-9
MAXIMUM ALLOWABLE EXTERIOR NOISE LEVELS FROM STATIONARY SOURCES[1]

SOUND LEVELS	DAYTIME HOURS 7:00 AM – 10:00 PM	NIGHTTIME HOURS 10:00 PM – 7:00 AM
Hourly Equivalent Sound Level (Leq, dB)	50	45
Maximum impulsive level, dB	65	60
Maximum level, dB	70	65

Source: San Luis Obispo County 1992
[1]For the purpose of evaluating conformance with these standards, the County Ordinance 22.10.120(E)(1) mandates the use of the A-weighted scale.

Policy 3.3.5c states that noise levels shall be reduced to or below noise level standards shown in Table 3-9 where the stationary noise source will expose vacant land in the Agriculture (and other specified) land use categories.

Policy 3.3.3 limits noise created by new transportation noise sources, such as traffic on public roadways, within outdoor activity areas, and in interior spaces of existing noise-sensitive land uses. The limit for residential land uses near transportation noise sources is 60 dB CNEL (community noise equivalent level) at the property line of the receiving land use.

San Luis Obispo County Code, Title 22, Land Use Ordinance
Noise levels in San Luis Obispo County are regulated under County Code Section 22.10.120. This section limits exterior noise levels affecting sensitive noise receptors to the levels shown in **Table 3-10**, Maximum Allowed Exterior Noise Level Standards. Noise sources associated with construction are exempt from noise standards, provided such activities do not take place before 7:00 AM or after 9:00 PM on any day except Saturday or Sunday, or before 8:00 AM or after 5:00 PM on Saturday or Sunday (Section 22.10.120(A)(4)).

TABLE 3-10
MAXIMUM ALLOWED EXTERIOR NOISE LEVEL STANDARDS

SOUND LEVELS	DAYTIME 7:00 AM – 10:00 PM WEEKDAYS	NIGHTTIME 10:00 PM – 7:00 AM
Hourly Equivalent Sound Level (Leq, dB)	50	45
Maximum level, dB	70	65

Source: San Luis Obispo County Code Section 22.10.12

County Code Section 22.10.170 (San Luis Obispo County 2008) contains vibration standards for activities within one-half mile of an urban or village reserve area, such as California Valley. However, construction activities are exempt from these standards so long as vibration-inducing activity is limited to between the hours of 7:00 AM and 9:00 PM. Moving sources of vibration, such as delivery trucks, are also exempt from these standards.

General Project Area
The region of influence with respect to noise includes the two study areas and the local and regional road network used to deliver equipment, materials, and employees to and from the Project Site. The project area is typical of a rural, agricultural setting. There are no substantial stationary noise sources in the project area. Sources of noise include diesel-engine tractors, generators, periodic agricultural tilling operations, and other farming equipment, traffic on Highway 58, natural sounds such as animals and wind, and occasional aircraft overflights.

Ambient noise levels were measured in September 2008 in support of a formerly proposed project and in September 2009 to provide information on the existing noise environment for the Topaz Solar Farm Draft EIR (San Luis Obispo County 2010a). Measurements were taken at local roadways and nearby

residences (**Figure 3-10**, Noise Measurement Locations). Noise levels measured at these locations are provided in **Table 3-11**, Noise Measurements. As shown in this table, fifteen-minute measurements taken between 1 and 3 PM revealed minimum noise levels between 32 and 41 dBA, maximum noise levels between 61 and 83 dBA, and average noise levels between 51 and 66 dBA. One-hour measurements were between 32 and 50 dBA at night and between 35 and 50 dBA during the day. Long-term measurements (25 hours at one location and 43 hours at three locations) were between 24 and 40 dBA during the night and between 30 and 43 dBA during the day) (Aspen Environmental Group 2009, California Energy Commission 2009).

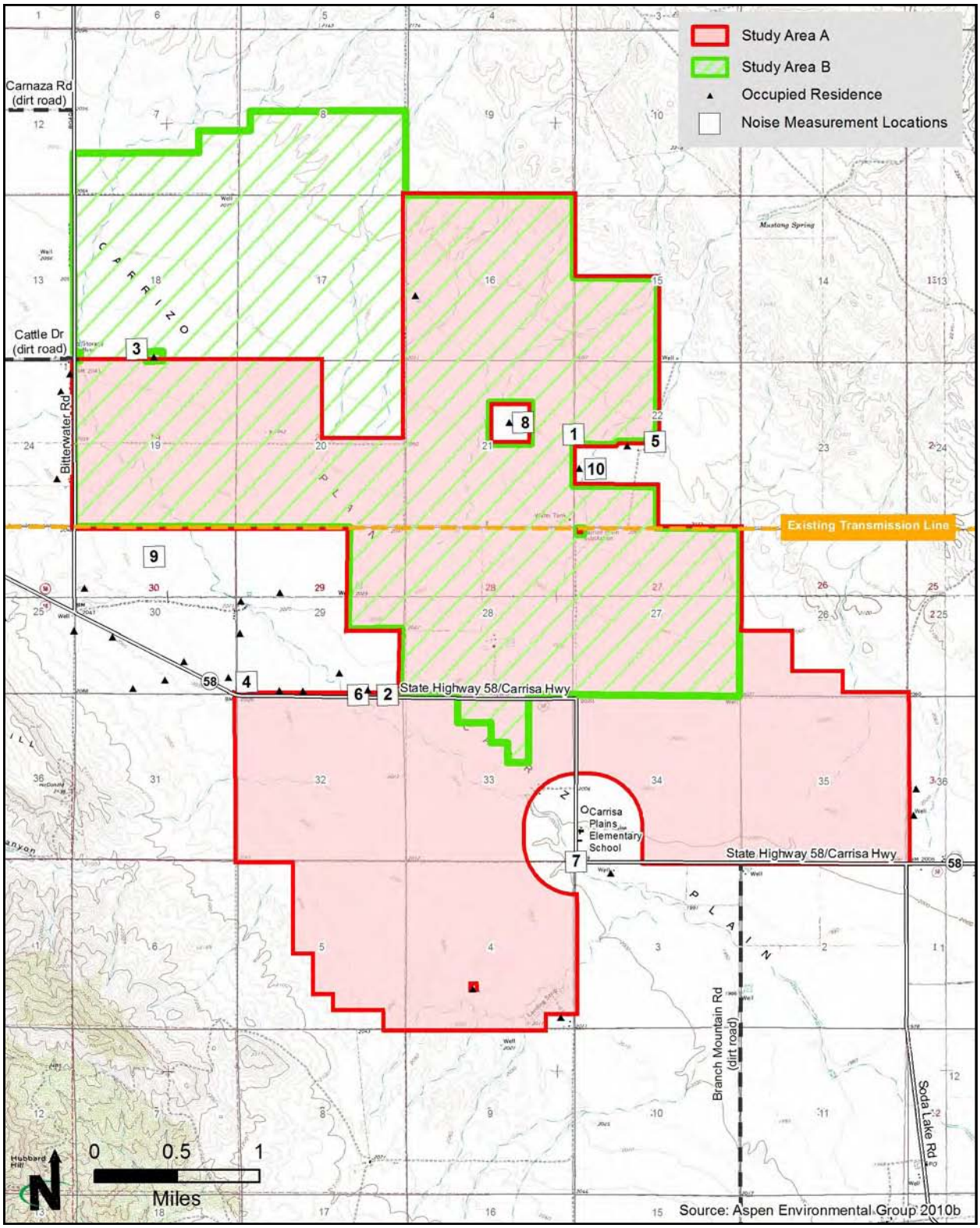
Sensitive noise receptors are generally considered to be homes, hospitals, schools, libraries, parks, and recreational areas. Sensitive receptors in the project area include the Carrisa Plains Elementary School and scattered rural residences within one mile of the project area. In addition, rural residences are present along some stretches of the proposed truck haul route. The sensitive receptors closest to the Project Site have been identified on Figure 3-10, and baseline noise measurements taken at these locations are described in Table 3-11.

Study Area A

The noise environment in Study Area A is similar to that of the general project area. Lands in this study area are open space or used for ranching and agriculture. There are two rural residences surrounded by Study Area A, one in Section 21 and one in Section 4 (see Figure 2-2). Table 2-2 indicates the approximate distances of the residential property boundaries from potential PV array development. The Project would also be set back a minimum of 400 feet from either side of Highway 58 and approximately 2,100 feet (over one-third mile) from Carrisa Plains Elementary School. The proposed Solar Energy Learning Center would be 400 feet from the school.

Study Area B

The noise environment in Study Area B is similar to that of the general project area. There is one rural residence surrounded by Study Area B, as well as two rural residences partially surrounded by Study Area B, one in Section 18 and one in Section 22 (see Figure 2-2). Table 2-2 indicates the approximate distances of the residential property boundaries from potential PV array development. The Project would also be set back a minimum of 400 feet from Highway 58, and the Carrisa Plains Elementary School would be 2,900 feet (over one-half mile) from the Study Area B boundary. The proposed Solar Energy Learning Center would be 4,500 feet from the school.



Noise measurements at sensitive receptor locations were taken in and around the Project Site.

Noise Measurement Locations

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-10

TABLE 3-11
NOISE MEASUREMENTS

MEASUREMENT LOCATION[1]	15-MINUTE MEASUREMENTS (DBA)			TIME OF MEASUREMENT
	LEQ	LMAX	LMIN	
1 (Corner of Pronghorn Plains Road)	66.1	83.5	41.1	9/17/2009 - 1:12 PM to 1:27 PM
2 (Highway 58 at Solar Way)	53.7	73.2	32.4	9/17/2009 - 1:37 PM to 1:52 PM
3 (Residence at 10525 Bitterwater Road)	51.8	61.2	34.2	9/17/2009 - 2:03 PM to 2:18 PM
MEASUREMENT LOCATION[1]	**1-HOUR MEASUREMENTS (DBA)**			**TIME OF MEASUREMENT**
	AVE. NIGHTTIME LEQ	**AVE. DAYTIME LEQ**		
ML1 (Between residences at 8710 and 8770 Highway 58)	43	48		9/23/2008 - 10:00 PM to 11:00 PM 9/24/2008 - 9:40 AM to 10:40 AM 9/24/2008 - 4:00 PM to 5:00 PM
ML3 (Residence northeast of Measurement Location Reyes)	32	35		9/24/2008 - 1:11 PM to 2:11 PM 9/24/2008 - 10:00 PM to 11:00 PM 9/25/2008 - 10:00 AM to 11:00 AM
SR10 (Residence along Highway 58 east of ML1)	50	50		9/23/2008 - 10:00 PM to 11:00 PM 9/24/2008 - 9:30 AM to 10:30 AM 9/24/2008 - 3:55 PM to 4:55 PM
MEASUREMENT LOCATION[1]	**LONG-TERM MEASUREMENTS (DBA)**			**TIME OF MEASUREMENT**
	AVE. NIGHTTIME LEQ	**AVE. DAYTIME LEQ**		
LT1 (Carrisa Plains Elementary School yard)	Not Available	47		9/24/2008 - 11:05 AM to 12:05 PM 9/24/2008 - 2:35 PM to 3:35 PM 9/24/2008 - 10:00 PM to 11:00 PM
Strobridge residence	24	33		9/23/2008 – 4:00 PM to 9/25/2008 – 11:00 AM (43 hours)
Bell future residence	25	30		9/23/2008 – 5:00 PM to 9/25/2008 – 12:00 PM (43 hours)
Reyes residence	33	37		9/24/2008 – 9:00 AM to 9/25/2008 – 10:00 AM (25 hours)

Source: 15-Minute Measurements: San Luis Obispo County 2010a, Table C.11-1; 1-Hour and Long-Term Measurements: CEC 2009, Table 6.
[1]Measurement locations are shown on Figure 3-10.
Leq = equivalent A-weighted sound level over a given period of time; Lmax = maximum measured noise level; Lmin = minimum measured noise level.

Reconductoring

The noise setting in the 35-mile-long reconductoring area is similar to that of the general project area, but a higher percentage of this setting is within one mile of Highway 58, introducing more consistent, pervasive noise from vehicle traffic. Corona activity introduces faint humming noises audible at very short distances from the transmission line. This humming can be louder and crackling sounds can be heard near the line during wet weather conditions. Within San Luis Obispo County, there are 23 residences within 2,000 feet of the transmission line, including two within 1,000 feet in the Carrizo Plain. In Kern County, the transmission line is within approximately 1,700 feet of residences in the town of Buttonwillow.

3.5.2 Environmental Impacts

Noise impacts would be considered substantial if the Proposed Project resulted in any of the following:

- The Project results in noise levels in excess of standards established in applicable federal, state, and local general plans or regulations; or
- Sensitive receptors are exposed to permanent increases in ambient noise levels of 10 dBA or more (the level at which most people perceive a doubling of sound).

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Construction would occur over a three-year period, typically during daytime hours (7:00 AM to 5:00 PM), Monday through Friday.

On-site Construction Noise. Construction of the Proposed Project would result in increases in noise levels during the duration of the three-year construction period. Increases in on-site noise levels would be temporary and intermittent as construction is completed in one area and progresses to the next area. The Project Proponent estimates that the equivalent of a 1.3-MW array would be constructed in approximately seven days, with noise-producing activities that are audible outside the PV array area occurring on four of these days. Four crews would work simultaneously but on dispersed areas of the site, avoiding a cumulative noise effect from each crew's construction equipment. Noise levels would have adverse impacts when in close proximity to sensitive receptors, but these impacts would be short-term, temporary, and intermittent. Construction would be in compliance with County Code by adhering to the hours listed above; construction activities are exempt from County noise standards if construction is limited to 7:00 AM to 5:00 PM, Monday through Friday.

Construction equipment anticipated to be used for this Project and equipment noise levels are displayed in **Table 3-12**, Construction Equipment Noise Levels at 50 Feet.

TABLE 3-12
CONSTRUCTION EQUIPMENT NOISE LEVELS AT 50 FEET

EQUIPMENT	NOISE LEVEL (DBA) 50 FEET FROM SOURCE
Backhoe	78
Concrete Mixer Truck	85
Concrete Pump Truck	82
Crane	85
Dump Truck	76
Excavator	81
Flatbed Truck	74
Front End Loader	79
Generator	82
Grader	83
Pickup Truck	75
Pneumatic Tools	85
Post Driver	72
Roller	85
Scraper	84

Source: US Federal Highway Administration 2006

The primary source of noise during the construction period would be the truck-mounted post drivers installing the steel support posts. Noise from one post driver is calculated to be 72 dBA at 50 feet (San Luis Obispo County 2010a). As displayed in Table 3-12, the maximum discrete noise level from construction equipment would be 85 dBA at 50 feet, or 73 dBA at 200 feet, the distance to the nearest residential property boundary under Alternative A. Average noise levels experienced by most residences would be lower, as most setbacks from residential properties are greater than 200 feet, as shown in Table 2-2.

The Draft EIR estimated that the post installation phase of construction would produce the highest noise levels of any construction phase, with an average 1-hour noise level of 89 dBA for one work crew operating 37 pieces of construction equipment (San Luis Obispo County 2010a). At 200 feet, this noise level would decrease to 76 dBA. Actual noise levels would be lower, however, as all 37 pieces of equipment are unlikely to be operating at the same time and in the same location on the 7-acre PV array area. As stated above, all construction would occur between 7:00 AM to 5:00 PM, Monday through Friday, and would therefore be consistent with County Code pertaining to noise.

Sensitive receptors, including the two rural residences surrounded by the Project and the Carrisa Plains Elementary School, would be exposed to temporary and intermittent noise levels greater than measured ambient levels. For example, with the proposed 2,100-foot buffer separating it from the Project Site, maximum exterior noise levels at Carrisa Plains Elementary School would be approximately 57 dBA. While construction would be in compliance with County Code, the Project Proponent would implement standard practices to minimize construction equipment-related noise (see Noi-2 in Table 2-9).

Construction-related Traffic Noise. Construction-related traffic would be another source of noise. Delivery and equipment trucks would travel to and from the Project Site via Highway 58 and Interstate 5. Employee vehicles and shuttle buses would utilize additional roads within the region, and trucks delivering aggregate from the various potential sources of aggregate would arrive on Highway 58 from the east or west. Sensitive receptors along these roads include rural residences and the Carrisa Plains Elementary School. To reduce noise impacts, equipment and materials deliveries would occur on weekdays between the hours of 9:00 AM and 4:00 PM, and large loads would be subject to terms of the Topaz Truck Management Plan. Construction delivery trucks would access the site via Highway 58, and all residences along this route are located more than 120 feet from the edge of the highway right-of-way. Construction-related noise levels, which would be temporary and intermittent, would be 54 dBA, which is less than the maximum allowable noise exposure limit of 60 dBA for transportation noise sources, as defined by Policy 3.3.3 of the General Plan Noise Element.

Operation. Noise from operation of the Proposed Project would be limited to vehicle use, the transformers and inverters, and heating, ventilation and air-conditioning systems. The maximum allowable noise ratings at the source for equipment at the site are 80 dBA for inverters within the enclosure, 65 dBA for transformers, 75 dBA for the exhaust fan mounted on each inverter enclosure, and 79 dBA for the two heating, ventilation, and air-conditioning systems mounted on each inverter enclosure. Sensitive noise receptors would be separated from the equipment by a great enough distance to meet the County noise standards described in Table 3-10 and would raise ambient noise levels at the property line by less than 10 dBA.

Operation of the medium-voltage collector lines would produce no notable noise or hum and would therefore have a negligible impact. The Solar Energy Learning Center would be located approximately 400 feet from the Carrisa Plain Elementary School for Alternative A. Noise impacts from operation of the center, including buses and vehicles transporting visitors, would be negligible. The vehicle traffic generated by 15 employees would represent a negligible increase in ambient noise levels.

Operation would include periodic security patrols and nighttime maintenance. Two perimeter patrols per day would be performed by security personnel. Noise impacts from security patrols would be minor.

Limited nighttime maintenance would be performed each month, from sundown to approximately 1:00 AM. Activities would likely include maintenance or replacement of Project components and would require the use of pickup trucks and portable generators for lighting. Maximum short-duration noise levels from this equipment are anticipated to be 75 dBA at 50 feet. Nighttime maintenance activities would typically take only a few hours to complete; therefore, because of the infrequent occurrence and short duration of any such activity, any adverse impact is expected to be minor.

The breakers associated with the switching station would produce maximum continuous noise levels of 79.6 dBA Leq at 3 feet or less than 45 dB Leq at 200 feet (San Luis Obispo County 2010). The maximum impulse noise level from the breakers would be approximately 105.1 dBA at 50 feet and would generally occur when a breaker gets thrown, which occurs infrequently. In the instance of a breaker being thrown, an instantaneous maximum noise level of 68.4 dBA would occur at a distance of 3,400 feet. This would exceed the County's maximum impulsive noise limits for stationary noise sources of 65 dBA during daytime and 60 dBA at nighttime. However, the noise level at the nearest residence, which is greater than 3,500 feet away, would be lower. In addition, breaker operation is infrequent, occurring during emergency operations, testing, or maintenance events. Because of the distance to the nearest residence, the infrequency of breaker operation, and the nature of the noise as a single impulse event rather than a repeated or extended noise event, the impact from breaker operation would be minor.

Decommissioning. Noise impacts from decommissioning are expected to be similar to those from construction. Measures to reduce noise impacts similar to those described for construction may be required by the County.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Noise impacts under Alternative B would be similar to those described for Alternative A. Carrisa Plains Elementary School would be 2,900 feet from the Project Site boundary, with maximum noise levels reaching 51 dBA. There is a 120-foot setback to the residential fence line in Section 18, where noise levels could temporarily and intermittently reach 77 dBA. The Project Proponent would implement the same measures as described for Alternative A to reduce noise impacts from construction equipment.

Operation. Noise impacts from operation of the Proposed Project in Alternative B would be similar to those described for Alternative A.

Decommissioning. Noise impacts from decommissioning in Alternative B are expected to be similar to those for Alternative A.

Reconductoring

Residences within one mile of the transmission line would experience temporary moderate noise impacts from construction activities. The construction period would last 20 months, but work would be spread out over 35 miles, minimizing the time any one location is exposed to construction noise. Construction would utilize heavy trucks and smaller passenger vehicles (e.g., pickup trucks) at reconductoring sites, and activities would include the reestablishment of roads, raising new towers, installing conductors, constructing the two switching stations, and restoring construction sites. In order to minimize noise impacts on sensitive receptors, PG&E will utilize portable noise barriers for compressors and similar stationary equipment, encourage the use of equipment with noise-control features, direct exhaust stacks away from residences, route traffic away from residential areas, and notify residents of the construction schedule (San Luis Obispo County 2010a).

Noise from operation of the reconductored transmission line would be similar to current conditions and would have negligible effects on sensitive receptors. Noise would be limited to corona activity (estimated at less than 50 dBA within the right-of-way) and periodic maintenance and patrols using pickup trucks and other vehicles.

No Action Alternative

Under the no action alternative, the Project would not be constructed. Therefore, noise impacts would remain the same as those currently experienced. Noise impacts along Highway 58 and other truck transportation and delivery routes would occur during construction of the CVSR, if the facility was permitted and constructed.

3.6 GEOLOGY AND SOILS

This section presents information on geology, mineral resources, and soils conditions in the project area. Baseline geologic, seismic, and soils information was collected from published and unpublished literature and geographic information systems (GIS) data. Data sources include but are not limited to the following:

- The Project Proponent's Revised Conditional Use Permit Application;
- Geologic literature from the US Geological Survey (USGS) and California Geological Survey (CGS); and
- Geologic and soils GIS data and available geotechnical reports for the area.

3.6.1 Affected Environment

Regulatory Framework

International Building Code
Published by the International Conference of Building Officials, the 2006 International Building Code addresses the design and installation of structures and building systems through requirements that emphasize performance. The International Building Code includes codes governing structural, fire, and life safety provisions covering seismic, wind, accessibility, egress, occupancy, and roofs.

California Building Code
The California Building Code (CBC), Title 24, Part 2 provides building codes and standards for design and construction of structures in California. The 2007 CBC is based on the 2006 International Building Code with the addition of more extensive structural seismic provisions. As the Proposed Project lies within Seismic Zone 4, provisions for design should follow the requirements of Chapter 16 of the CBC, which contains definitions of seismic sources and the procedure used to calculate seismic forces on structures. Chapter 33 of the CBC contains requirements relevant to the construction of underground transmission lines.

Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code, §§ 2621–2630
The Alquist-Priolo Earthquake Fault Zoning Act of 1972 (formerly the Special Studies Zoning Act) regulates development and construction of buildings intended for human occupancy to avoid the hazard of surface fault rupture. While this act does not specifically regulate solar projects and overhead transmission lines, it does help define areas where fault rupture is most likely to occur.

The Seismic Hazards Mapping Act, Public Resources Code, §§ 2690–2699
The Seismic Hazards Mapping Act of 1990 (Public Resources Code, Chapter 7.8, Division 2) directs the CGS to delineate seismic hazard zones. The purpose of the act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. Cities, counties, and state agencies are directed to use seismic hazard zone maps developed by CGS in their land use planning and permitting processes.

San Luis Obispo County General Plan Land Use Element and Land Use Ordinance
San Luis Obispo County's Land Use Ordinance and General Plan Land Use Element provide criteria for evaluation of geologic hazards and geotechnical requirements related to new development. In addition, there are relevant goals and policies found in the Conservation and Open Space Element of the general plan.

General Project Area

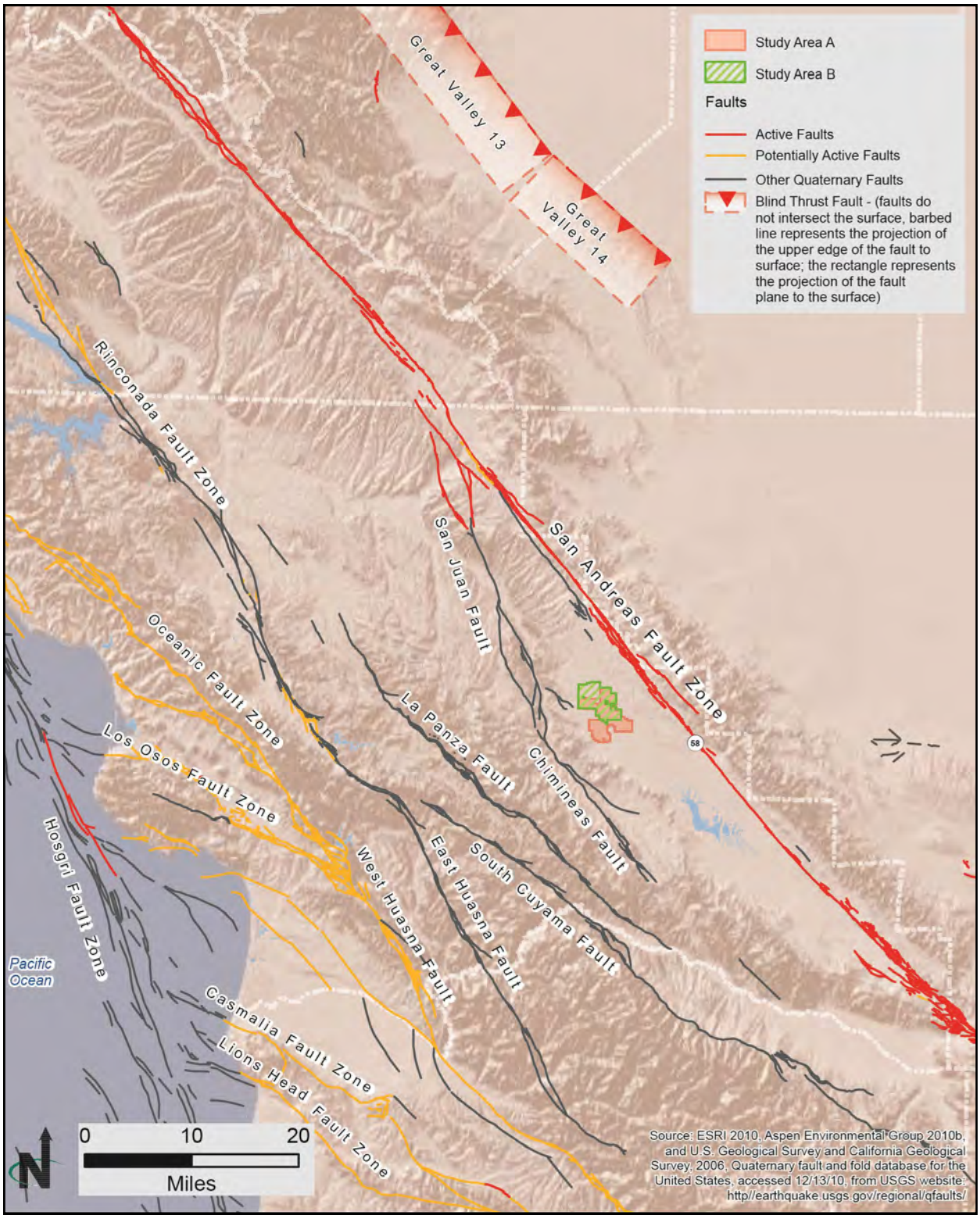
The Project Site is near the northern end of the Carrizo Plain, an internally drained, northwest-southeast trending narrow plain and alluvial valley. The Carrizo Plain area is part of the southern Coast Ranges geomorphic province (CGS 2002). The southern Coast Ranges geomorphic province is characterized by a series of mountain ranges and valleys trending northwest approximately parallel to the Pacific Coast. In the project area, the key features of the southern Coast Ranges include the La Panza Range, the Caliente Range, the Temblor Range, the Cuyama Valley, the San Juan Valley, and the Carrizo Plain.

The Carrizo Plain is approximately nine miles wide, 46 miles long, and bounded by the Temblor Range on the east, the Caliente Range on the south and southwest, and the La Panza Range on the west and northwest. The northern end of the Carrizo Plain is bounded by the convergence of the western foothills of the Temblor Range and the eastern foothills of the La Panza Range. The Carrizo Plain is a perched basin, and the floor of the plain is higher than those of the neighboring valleys. Elevations of the Carrizo Plain range from a low of approximately 1,900 feet above mean sea level near the Soda Lake basin to a high of approximately 2,500 feet in the Southern Elkhorn Hills at the far southeastern end of the Carrizo Plain.

The San Andreas Fault Zone is the most significant geologic structure in the Carrizo Plain and passes about 2.5 miles east of the Proposed Project. The mountains surrounding the Carrizo Plain area are also cut by many other potentially active and older inactive faults including the Big Spring Thrust Fault, the San Juan Fault, the Chimineas Fault, and the La Panza reverse fault and the Morales fault. **Figure 3-11**, Seismology, shows locations of active and potentially active faults (representing possible seismic sources) in the region surrounding the project area. Regional active faults could generate an earthquake capable of impacting the proposed project area.

Impacts of an earthquake are discussed in terms of intensity of the earthquake, degree ground shaking, and soil liquefaction potential. The amount of energy released has traditionally been quantified using the Richter scale. Recently, seismologists have begun using a Moment Magnitude (M) scale because it provides a more accurate measurement of the size of major and great earthquakes. For earthquakes of less than M 7.0, the Moment and Richter Magnitude scales are nearly identical. For earthquake magnitudes greater than M 7.0, readings on the Moment Magnitude scale are slightly greater than a corresponding Richter Magnitude.

Historic seismicity in the vicinity of the Project has been generally low, with primarily small earthquakes of magnitudes of M 5.0 or less occurring within the last two centuries. Fourteen earthquakes of magnitude M 5.5 or greater have occurred within 50 miles of the Project Site since 1850; however, none of these were within 25 miles of the site (Blake 2000).



The Proposed Project is in a seismically active area. The San Andreas Fault is 2.5 miles to the east.

Seismology

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-11

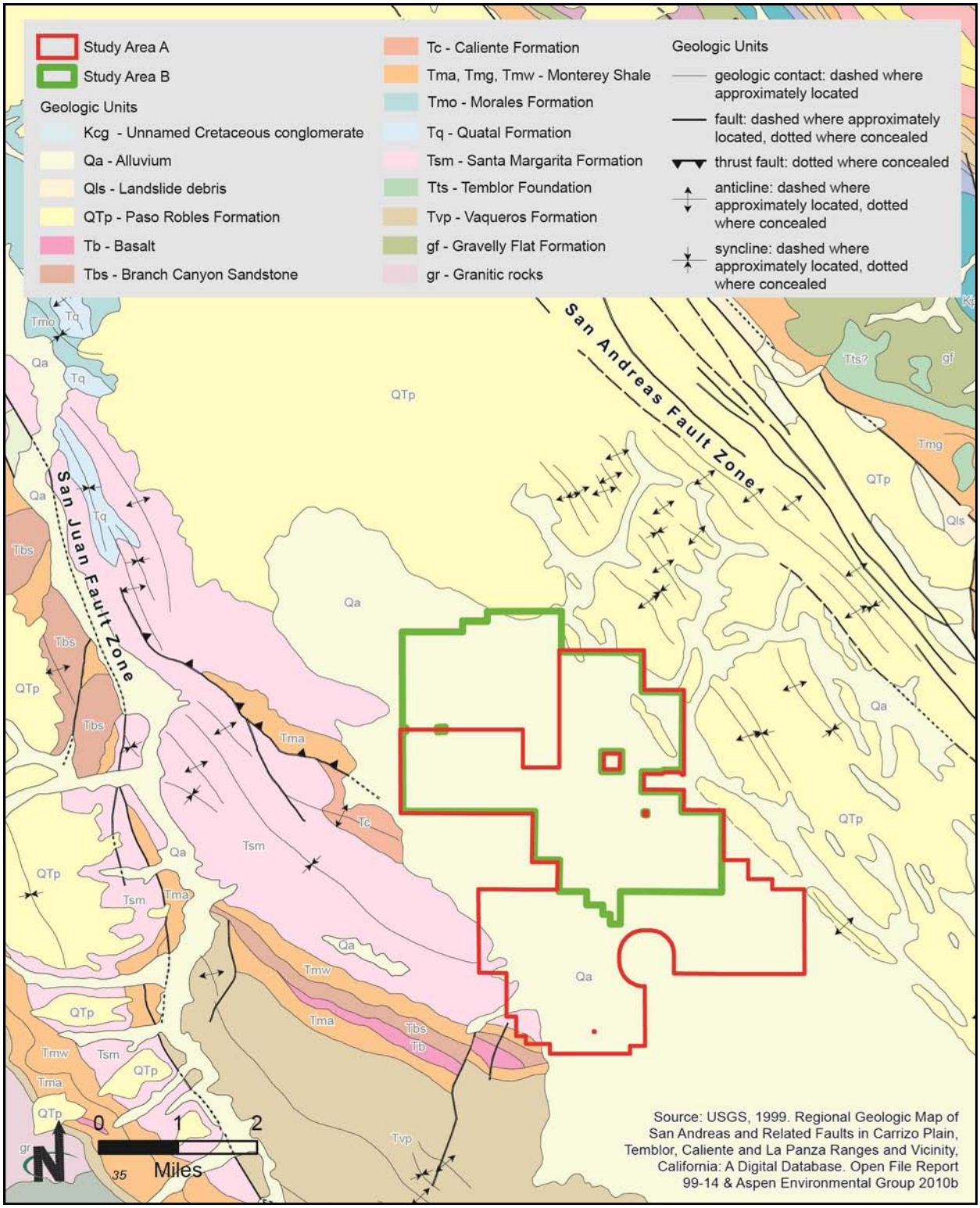
The intensity of the seismic shaking during an earthquake is dependent on the distance between the project area and the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the project area. Earthquakes occurring on faults closest to the project area would most likely generate the largest ground motion. The intensity of earthquake-induced ground motions can be described using peak site accelerations, represented as a fraction of the acceleration of gravity. Liquefaction is the phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of earthquake-induced strong ground shaking. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of the granular sediments and the magnitude and frequency of earthquakes in the surrounding region. The Proposed Project would likely experience moderate to intense ground shaking from an earthquake during the design life of the Project facilities.

The proposed project area is located on alluvial fan and fluvial deposits shed from the nearby La Panza and Temblor Ranges, located west to northwest and east to northeast of the Carrizo Plain, respectively. The Quaternary sediments overlie folded and thrust-faulted Tertiary deposits in a shallow syncline, which in turn overlies crystalline gneiss, granodiorite, and gabbro basement rocks of Cretaceous age (Dibblee 1973). The Quaternary sediments are composed of sand, silt, gravel, and mud in stream channels, terraces, alluvial fans, and locally they include colluvium. The Quaternary-age deposits are generally unconsolidated to semi-consolidated. The southwestern-most portion of the Project Site is in the low foothills at the base of the La Panza Range where consolidated Tertiary age sandstone, siltstone, and shale are exposed on the slopes and underlie the Quaternary alluvial fan deposits. **Figure 3-12,** Regional Geology, shows the location of the Proposed Project relative to geologic features and units in the project area.

Study Area A

Topography and Slope Stability

Most of Study Area A is located on gently sloping alluvial fan and plain that has been dissected by numerous small ephemeral drainages. The southern corner of Study Area A is on the gently to moderately sloping foothills of the La Panza Range. Elevations within the site range from approximately 2,208 feet in the far northeast corner to approximately 2,005 feet near the southeast corner. The northern portion of the site slopes gently to the south and southwest, while the southwestern portion of the site slopes down from the La Panza foothills to the northeast. There are no mapped landslides within Study Area A, and the gently sloping terrain of most of the site would preclude slope stability issues. The portion of the site along the La Panza Range foothills where the topography is moderately sloping could potentially be subject to slope instability, although no landslides have been mapped in this area (Bartow 1991).



The project area is characterized by a series of mountain ranges and valleys trending northwest approximately parallel to the Pacific Coast.

Regional Geology

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-12

Geology

Geologic units underlying Study Area A are primarily undifferentiated Quaternary alluvial deposits and Quaternary Paso Robles Formation. A small amount of Tertiary Santa Margarita Formation sandstone and a very small amount of Tertiary Whiterock Bluff Shale Member of the Monterey Shale are mapped as underlying the southwestern corner of the site where the site runs along the foothills of the La Panza Range (Dibblee 1973; Bartow 1991) (Figure 3-12). Geotechnical surveys conducted for the Proposed Project by Earth Systems Southwest (ESSW 2010) and for the previously proposed Ausra Carrizo Energy Solar Farm (URS 2007a) within Study Area A indicate that with the exception of the low hill in the northern part of the site, Study Area A is primarily covered by a 1.5- to 5-foot-deep layer of recent to Holocene alluvium, locally as deep as nine feet. The geotechnical borings indicate that the alluvium is generally fine grained, consisting of loose to medium dense and medium stiff to stiff clay, clayey sand, sandy silt, and silty clay, each with varying amounts of silt, clay, and sand, and locally contains minor gravel up to five inches in diameter.

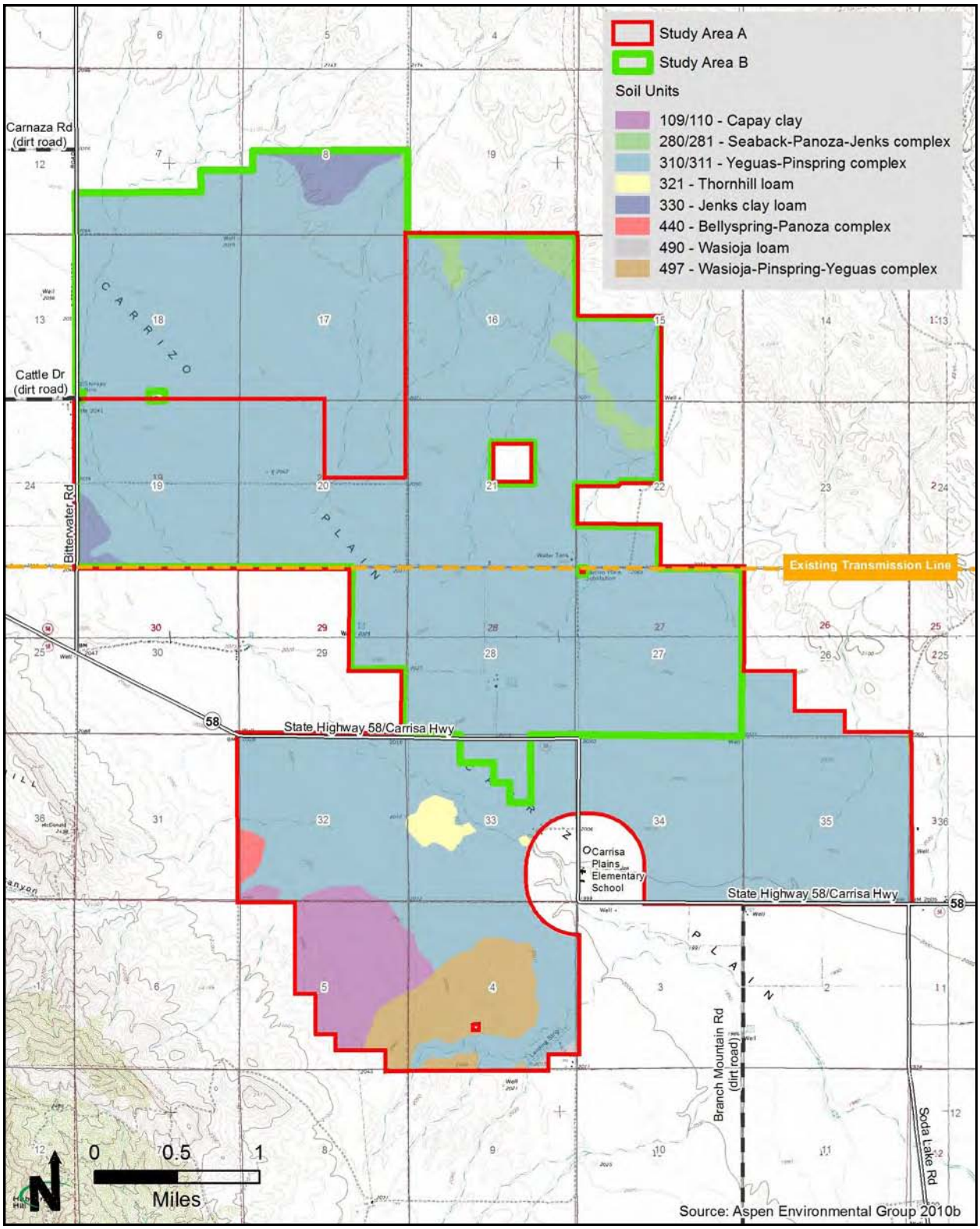
Faults and Seismicity

No known active faults cross Study Area A; however, a buried strand of older bedrock thrust fault trends toward the southern portion of the site (see Figure 3-11). Although the apparent projected trend of this fault splay crosses the southern portion of Study Area A from the northwest to the southeast and potentially crosses Proposed Project PV arrays, it does not trend through any Project buildings, and this older bedrock fault is not likely to experience primary seismic activity and rupture.

The estimated approximate peak ground acceleration from large earthquakes on the causative fault (the San Andreas Fault) range from 0.57 gravity and 0.90 gravity for earthquake recurrence intervals of 475 and 2,475 years, respectively (USGS 2010). Most of the Study Area A site is mapped as having high potential for liquefaction hazards (San Luis Obispo County 1999). This is generally due to the presence of alluvial soil and localized areas of shallow groundwater in the Carrizo Plain. Soils encountered in geotechnical borings, however, are fine grained non-liquefiable soils and would not generally be susceptible to liquefaction. Therefore, liquefaction hazards for the site are considered to be minor (URS 2007a; ESSW 2010).

Soils

Soils within Study Area A reflect the underlying rock type, the extent of weathering of the rock, the degree of slope, and the degree of human modification. The route crosses undeveloped desert, agricultural, and rural residential land. Based on the NRCS soil survey for San Luis Obispo County, California Carrizo Plain Area, there are nine soil units identified within the Study Area A boundaries, as shown in **Figure 3-13**, Soil Units. These nine units represent components of six soil associations or complexes. Three main soil



Soils in the project area are highly expansive, moderately to severely corrosive to ferrous metals, and aggressive to copper.

Soil Units

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-13

groups have been mapped in the Study Area A boundaries: the Capay clay, the Yeguas-Pinspring complex, and the Wasioja-Pinspring-Yeguas complex (NRCS 2008). The Capay clay soil unit consists primarily of clay with smaller amounts of loam and clay loam with high shrink-swell potential, high corrosion potential against unprotected steel and moderate corrosion potential for concrete (NRCS 2008). The Yeguas-Pinspring complex consists primarily of loam and clay loam with smaller amounts of sandy loam with a low to moderate shrink-swell potential, high corrosion potential against unprotected steel, and low corrosion potential for concrete (NRCS 2008). Laboratory testing of soils conducted for the study area indicate that the soils are highly expansive, moderately to severely corrosive to ferrous metals, and aggressive to copper. The testing indicated that the sulfate concentrations were negligible, and therefore the soils were not particularly corrosive to concrete (ESSW 2010).

With the exception of the Capay clay, all of the soils in the Study Area A project area are classified as moderately susceptible to wind erosion and sheet and rill water erosion (NRCS 2008). The Capay clay is only mildly susceptible to wind erosion but is moderately susceptible to sheet and rill erosion. Erosion potential would increase where these soils are disturbed by grading or vehicle travel that loosens the upper surface or removes protective vegetation.

Data from the Carrizo Plain Area soil survey (NRCS 2008) indicates that the soils such as those contained within Study Area A have limitations for use as septic tank absorption fields for Project-related sewage disposal based on shallow depths to bedrock and low permeability. However, percolation tests performed by ESSW demonstrated moderate to moderately rapid soil percolation rates feasible for septic system use for at least one proposed septic system location (ESSW 2010).

Mineral Resources

Although the Project Site is only 10 to 20 miles west of several important oil fields in Kern County, only plugged and abandoned holes have resulted from oil well drilling in the project area of Carrizo Plain (DOGGR 2010). There are no metallic mineral deposits within Study Area A (USGS 2005).

Study Area B

Topography and Slope Stability

Study Area B is located entirely on gently sloping alluvial fan and plain that has been dissected by numerous small ephemeral drainages. The eastern edge of the site is adjacent to and touching the folded and uplifted small hills that are near the eastern side of the Carrizo Plain. Elevations within Study Area B range from approximately 2,130 feet near the northeast corner to approximately 2,010 feet near the southern edge. The site slopes gently to the south and southwest and is heavily dissected, resulting in uneven topography. There are no mapped

landslides within Study Area B, and the gently sloping terrain of the site would preclude slope stability issues.

Geology

The geologic units underlying Study Area B are the same as those that underlie Study Area A. Although not exposed within Study Area B, Miocene-aged Santa Margarita Formation is most likely present beneath the alluvium in the western portions of the site near the La Panza Range foothills.

Materials encountered in the borings conducted during geotechnical surveys for the Proposed Project (ESSW 2010) and for the formerly proposed Ausra project (URS 2007a) consisted of top soil, alluvium, and Paso Robles Formation. The alluvial deposits encountered in the geotechnical borings are relatively shallow in this area and are underlain by Paso Robles Formation at average depths of 1.5 to 5 feet. The top soil and alluvial units consisted primarily of loose to medium dense and medium stiff to stiff clayey sand, sandy clay, and sandy silt, all with varying amounts of sand, silt, and gravel. The Paso Robles Formation was primarily encountered in the borings below the top soil and alluvial deposits at depths ranging from 1.5 to 8 feet and consists of semi-consolidated and weathered sandstone and siltstone with varying amounts of gravel (ESSW 2010).

Faults and Seismicity

No known active or potentially active faults cross the Study Area B site; therefore, the potential for surface fault rupture at the site is negligible. Estimated peak ground acceleration in Study Area B from large earthquakes on the causative fault (the San Andreas Fault) range from 0.58 gravity and 0.91 gravity for earthquake recurrence intervals of 475 and 2,475 years, respectively (USGS 2010). Soil and groundwater characteristics related to liquefaction hazard potential are the same as described for Study Area A and are generally considered to be negligible.

Soils

As shown in Figure 3-13, there is one main soil group associated with Study Area B, the Yeguas-Pinspring complex, with only small proportions of two other soil associations (NRCS 2008). The Yeguas-Pinspring complex consists primarily of loam and clay loam with smaller amounts of sandy loam with a low to moderate shrink-swell potential, high corrosion potential against unprotected steel, and low corrosion potential for concrete (NRCS 2008). As with Study Area A, laboratory testing of soils indicate that the soils are highly expansive, moderately to severely corrosive to ferrous metals, and aggressive to copper. The testing indicated that the sulfate concentrations were negligible and therefore the soils were not particularly corrosive to concrete (ESSW 2010).

All of the soils in Study Area B are classified as moderately susceptible to wind erosion and sheet and rill water erosion (NRCS 2008). Erosion potential would increase where these soils are disturbed by grading or vehicle travel that loosens the upper surface or removes protective vegetation.

As discussed for Study Area A, data from the Carrizo Plain Area soil survey indicates that the soils such as those contained within Study Area B have limitations for use as septic tank absorption fields; however, site testing has demonstrated soil percolation rates suitable for septic system use (ESSW 2010).

Mineral Resources
No known mining or mineral resource sites are identified within 1,000 feet of Study Area B.

Reconductoring
The PG&E 230-kv transmission line crosses the San Andreas Fault, and a segment of the line is within the Alquist-Priolo Earthquake Zone and about 200 to 400 feet east of the nearest mapped fault trace. The Working Group on California Earthquake Probabilities (2008) reported that the southern San Andreas fault has a 59 percent probability of generating a magnitude 6.7 or greater earthquake within the next 30 years.

The transmission line also crosses an area of landslide potential (Kern County 1982), and a portion of the existing ROW is on and adjacent to areas designated as Mineral and Petroleum Areas in the Kern County General Plan (Kern County 1982). An eastern segment of the transmission line crosses the BLM-managed Lokern Area of Critical Environmental Concern (ACEC). This area is considered to have high potential for the occurrence of oil and gas; however, the ACEC lies in a northwest trending synclinal area, which is not considered highly prospective for oil and gas (BLM 1997).

3.6.2 Environmental Impacts

Impacts of the Proposed Project would be considered substantial if they resulted in one or more of the following:

- Triggered or accelerated geologic processes such as landslides, substantial soil erosion, or loss of topsoil during construction;
- Exposed people or structures to potential risk of loss or injury where there is high potential for seismically induced hazards, including ground shaking, landslides, liquefaction, settlement, lateral spreading, and/or surface cracking;
- Exposed people or structures to potential risk of loss or injury where corrosive, expansive or other unsuitable soils are present; or
- Precluded the future extraction of valuable mineral resources.

Proposed Action

Impacts on soil resources and seismicity are described below for construction, operation, and decommissioning. There are no known active mines or mineral resource sites within the Proposed Site; therefore, there would be no direct or indirect impacts on mineral resources under either alternative.

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Grading under Alternative A would be performed for construction staging areas, the PCS (inverter enclosures) and adjacent transformers, the Project substation and PG&E switching station, the access roads, the Solar Energy Learning Center, the monitoring and maintenance facility, and limited areas where slopes are too steep to accommodate PV arrays. Grading would loosen or remove the upper soil surface and protective vegetation. The soils in the project area are distinctly fine grained and are classified as moderately susceptible to wind and water erosion (NRCS 2010); therefore, disturbed surfaces would result in increased erosion risk and a potential for direct impacts on soil. Grading would maintain watershed features, allowing drainages to enter and exit the Project Site in historic locations and meander through the site on a natural course, thus limiting water erosion potential. Best management practices would be employed to minimize soil erosion. These measures would include, but are not limited to, the following:

- Revegetation of temporarily disturbed areas post construction;
- Construction of silt fences for erosion control along the downstream edge of groups of arrays and fiber rolls along roads and easements; and
- Implementation of a construction SWPPP prior to the commencement of soil-disturbing construction activities.

Assuming control measures are implemented, the impacts from soil erosion would be minor to moderate. Potential impacts from sediment and soil erosion on water quality are discussed in Section 3.7, Water Resources.

Locally, slope instability and landslides have the potential to impact Project facilities. Slope failures could occur along the moderate slopes of the La Panza Range foothills in the southwestern corner of the proposed Project Site. Slope failure could be triggered by construction grading or by natural processes such as earthquakes, resulting in damage to or collapse of Project structures. The County may require the Project Proponent to conduct landslide and slope stability studies to determine whether engineering controls are necessary to prevent slope failure.

Soil testing was conducted as part of the geotechnical investigation conducted for the Proposed Project (ESSW 2010). Testing indicated that soils underlying Study Area A are moderately to severely corrosive to steel, are aggressive to copper, and are expansive. Corrosive soils where Project components would be

located could have a detrimental effect on metals and depending on the degree of corrosivity of subsurface soils metal structures exposed to these soils could deteriorate, eventually leading to structural failures. Expansive soils can also cause problems to structures by causing differential and cyclical foundation movements that can cause damage and/or distress to structures and equipment. The geotechnical report (ESSW 2010) proposed the following design measures to prevent adverse impacts associated with construction in corrosive and expansive soils:

- To account for the presence of expansive soils, conventional foundations for the monitoring and maintenance facility and the Solar Energy Learning Center and equipment supports should be deepened below typical minimum depths, and reinforcement should be increased over typical minimum quantities. Slabs-on-grade for these structures should be provided with a cushion of non-expansive soils;
- The Project Site soils are classified as severely corrosive to ferrous metals and aggressive to copper. An allowance for this corrosion should be made in the design of the piles, or the piles should be provided with a high-quality, abrasion-resistant coating. Steel piles should not be partially encased in concrete or placed next to concrete without a non-conductive barrier; and
- Steel piles should not be shorted to any other metallic structures, including concrete reinforcing steel or copper grounding mats.

The Proposed Project would include construction of an on-site septic and leach field for wastewater disposal for the monitoring and maintenance facility and the Solar Energy Learning Center. Anticipated peak flow is 1,500 gallons into portable sanitation facilities per day during construction and 135 gallons into the leach field per day during Project operation. Data from the Carrizo Plain Area soil survey (NRCS 2008) indicates that Project Site soils have limitations for use as septic tank absorption fields. However, site-specific soil percolation tests conducted in the vicinity of the proposed monitoring and maintenance facility demonstrate that an on-site septic system and leach field is most likely feasible in this location (ESSW 2010). Additional testing would be performed in accordance with the San Luis Obispo County Planning and Building Department prior to final leach field design. Assuming all County recommendations are followed in Project design, impacts on soils related to wastewater disposal would be negligible to minor.

Operation. No active faults cross the Project Site and thus there is no potential for damage to Project structures or hazards to people at the Project Site from surface fault rupture. Due to the very close proximity of the San Andreas Fault, local strong to severe groundshaking with vertical and horizontal ground accelerations could potentially occur at the Proposed Project; however,

following California building code design requirements would mitigate the potential for significant damage to Project buildings and facilities. The geotechnical engineering report prepared by ESSW for the Proposed Project presents seismic design parameters for Proposed Project improvements and facilities for use in final Project design. Standard geotechnical engineering practices and adherence to seismic building code requirements would minimize potential impacts.

Decommissioning. Potential soil erosion impacts would be similar to but of lesser scope than those described for construction. No additional impacts on soils and geology are anticipated with decommissioning,

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Soils underlying Study Area B have the same potential for wind and water erosion as those underlying Study Area A. Impacts related to erosion or loss of topsoil for Study Area B would be the same as described for Study Area A.

The topography of Study Area B, while uneven and dissected, is relatively gentle and would not be subject to slope failures. There would be no impact related to landslides or slope failures.

Siting and design for the septic system for Study Area B would be the same as for Study Area A; therefore, impacts would be identical for Study Area B related to soil capacity for adequate disposal of wastewater.

Operation. No active faults cross the Project Site; therefore, there is no potential for damage to Project structures or hazards to people at the Project Site from surface fault rupture. There would be no impact, and no mitigation would be required. As with Study Area A, Study Area B may be subject to strong to severe groundshaking during the life of the Project. Impacts related to seismically induced groundshaking are the same for Study Area B as those described for Study Area A.

Soil testing conducted as part of the geotechnical investigation conducted for the Proposed Project (ESSW 2010) indicates that soils underlying the Project Site are moderately to severely corrosive to steel, are aggressive to copper, and are expansive. Potential impacts from these unsuitable soil characteristics and measures to address them would be the same as described for Study Area A.

Decommissioning. Soil erosion impacts from decommissioning would be similar to those described for construction. No additional impacts on soils and geology are anticipated with decommissioning.

Reconductoring

Reconductoring would result in potential short-term and localized erosion impacts during construction. Measures to address these potential impacts would include protecting against instability of slopes adjacent to any re-graded access or spur roads, work areas, or replacement towers during and after the reconductoring work, taking appropriate measures to address soft or loose soils encountered during construction, and implementing standard erosion control measures.

Segments of the transmission line are within 200 feet of the Alquist-Priolo Earthquake Zone. Seismically induced slope failures, such as landslides, could occur in the event of a large earthquake in areas with moderate to steep slopes. This could result in damage to or collapse of transmission line structures. Although it is not possible to fully negate the potential for severe to very strong ground shaking to damage project structures in the event of a significant earthquake on the adjacent San Andreas fault, design-level geotechnical studies, fault evaluation, and appropriate structural design of structures prior to construction would minimize the potential for structure failure.

No Action Alternative

Under the no action alternative, soil erosion impacts caused by land use practices such as ranching and farming would continue. No additional impacts would occur on soil erosion or slope instability, problematic soil issues, or seismically induced ground failure or ground shaking.

3.7 WATER RESOURCES

3.7.1 Affected Environment

Regulatory Framework

Clean Water Act

The CWA established the basic structure for regulating discharges of pollutants into Waters of the US, including setting water quality standards for all contaminants in surface waters. Under Sections 301 and 402, the CWA made it unlawful for any person to discharge any pollutant from a point source into navigable Waters of the US unless a National Pollutant Discharge Elimination System (NPDES) permit was obtained. Permits under Section 402 are generally issued by the state in which the activity is proposed. For discharge of dredged or fill material into Waters of the US, including wetlands, a Section 404 permit from the USACE is required. Under Section 401, the CWA requires the state to issue water quality certifications for discharges of fill and dredged material to waters of the state, including wetlands, headwaters, and riparian areas.

Executive Order 11990, Protection of Wetlands

Executive Order 11990 directs federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial value of wetlands in carrying out programs affecting land use.

Executive Order 11988, Floodplain Management, as amended by Executive Order 12148

This Executive Order directs each federal agency to take action to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Agencies are further required to avoid direct or indirect support of floodplain development whenever there is a practicable alternative.

Compliance with Floodplain and Wetland Environmental Review Requirements

These requirements, set forth under 10 CFR Parts 1021 and 1022, amend DOE's floodplain and wetland environmental review requirements to add flexibility and remove unnecessary procedural burdens. Among other revisions, DOE is permitted to issue floodplain statements of findings in a final EIS or separately.

Federal Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA), the EPA sets drinking water standards referred to as the National Primary Drinking Water Regulations, 40 CFR Part 141, and the National Secondary Drinking Water Regulations, 40 CFR Part 143. These regulations set maximum contaminant levels (MCLs) for substances in drinking water and apply to groundwater if the groundwater is a source of potable water. Groundwater rights are not subject to federal regulation.

California Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1967, Water Code Section 13000 et seq. regulates surface water and groundwater within California and assigns responsibility for implementing CWA Sections 401, 402, and 303(d) to the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs).

California Construction General Storm Water Permit

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the NPDES program. In California, the EPA has delegated to the SWRCB the authority to administer the NPDES program through the RWQCBs and has developed a general permit for Storm Water Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ) (Construction General Permit). Construction activities that disturb more than one acre are required to obtain coverage under the Construction General Permit from the SWRCB. The Construction General Permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) that specifies Best Management Practices (BMPs) for controlling

stormwater, reduces pollutants that leave the site, and minimize erosion caused by the Project.

California Safe Drinking Water Act
The California Safe Drinking Water Act (CA SDWA) was passed to expand on the federal SDWA. The CA SDWA authorizes the state Department of Health Services (DHS) to protect the public from contaminants in drinking water by establishing MCLs that are at least as stringent as those developed by the EPA, as required by the federal SDWA. DHS has the authority to set advisory levels and MCLs. The California DHS lists any contaminants that may have any adverse health effects, based on expert opinion, and may occur in public water systems, including all the substances for which federal MCLs exist.

Streambed Alteration Agreements, California Fish and Game Code, Sections 1601 – 1603
Under these sections of the Fish and Game Code, the applicant is required to notify the California Department of Fish and Game (CDFG) prior to constructing any project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review generally occur during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, CDFG is required to propose reasonable project changes to protect the resource. These modifications are formalized in a Streambed Alteration Agreement that becomes part of the plans, specifications, and bid documents for the project.

California Water Code §13751
California Water Code §13751 requires a Report of Well Completion to be filed with the California Department of Water Resources (CDWR) within 60 days of well completion. New wells must comply with CDWR Well Standards as described in Water Resources Bulletins 74-81 and 74-90.

San Luis Obispo County Title 22, Land Use Ordinance
County Code requires approval of a drainage plan for all projects and activities located in a flood hazard zone or required to have a land use permit.

General Project Area

Carrizo Plain Watershed
The Project Site is within the Carrizo Plain HUC 8 (18060003) watershed in the 11,300-square-mile Central Coast Hydrologic Region. The Carrizo Plain watershed is bound by the Temblor Coastal Range to the east and the Caliente San Juan Coastal Range to the west. The watershed is approximately 54 miles north-to-south and 6 miles east-to-west, covering approximately 414 square miles (263,680 acres) (URS 2009). Elevation of the basin floor is approximately 2,000 feet above mean sea level.

The topography of the Carrizo Plain is generally flat with rolling hills toward the southeastern end. The semi-arid lands within the plain receive between 7 and 9 inches of precipitation per year. Consistent with precipitation patterns across Central California, the Project Site receives most of its rainfall between November and May and experiences minimal rainfall during the summer months. There is no surface outflow from the Carrizo Plain basin—precipitation that does not infiltrate the soil drains to Soda Lake, a playa lake south of the Project Site that is typically dry for part of the year (URS 2009).

Waters of the United States

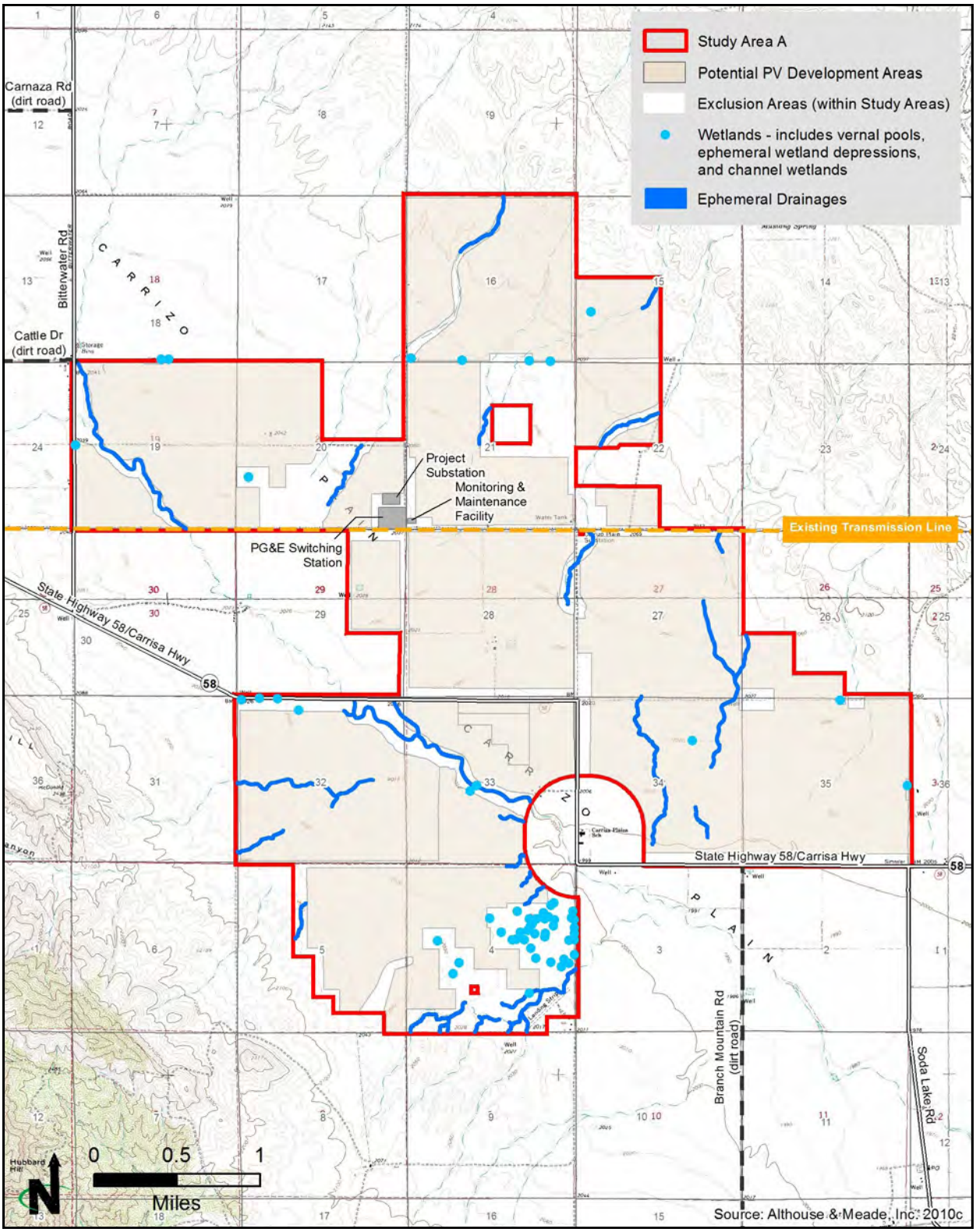
Delineations for Waters of the US (jurisdictional waters), including wetlands, were conducted at the Project Site between 2008 and 2010. All mapped drainages were observed to have a defined bed, bank, channel, and ordinary high water mark. Identification of wetlands was based on the collective presence of hydric soil, wetland hydrology, and wetland vegetation indicators as required by the USACE 1987 Manual, the Arid West Regional Supplement (USACE 2008), guidance documents, and regulations (Althouse and Meade and Huffman-Broadway Group 2010). Jurisdictional wetlands identified within the Project Site include vernal pools, wetlands within three ephemeral drainages ("channel wetlands"), and ephemeral wetland depressions. **Figure 3-14**, Wetlands and Other Waters of the US – Study Area A and **Figure 3-15**, Wetlands and Other Waters of the US – Study Area B depict these areas.

Floodplains

In August 2008, the Federal Emergency Management Agency (FEMA) released Flood Insurance Rate Maps (FIRM) for the area. FIRM panels 0975F and 1200F show three areas of Zone A floodplain within the Project Site. FEMA floodplains are depicted on **Figure 3-16**, Floodplains – Study Area A and **Figure 3-17**, Floodplains – Study Area B. Paved and dirt roads exist on-site that cross these areas.

Groundwater Supply

The Project Site overlies the Carrizo Plain groundwater basin, which has a total storage capacity of approximately 400,000 acre-feet and receives recharge from the percolation of stream flow and the infiltration of rainfall (CDWR 2004). Water-bearing sedimentary formations in the project area are tilted generally towards the north and east, with primary aquifers found in Paso Robles Formation, Santa Margarita Formation, and Morales Formation alluvium. Two aquifers provide the majority of groundwater supply. These include an Upper Aquifer that is generally shallower than 300 feet below ground surface (bgs) and a Lower Aquifer below the Upper Aquifer that reaches a depth of approximately 450 to 600 feet bgs.

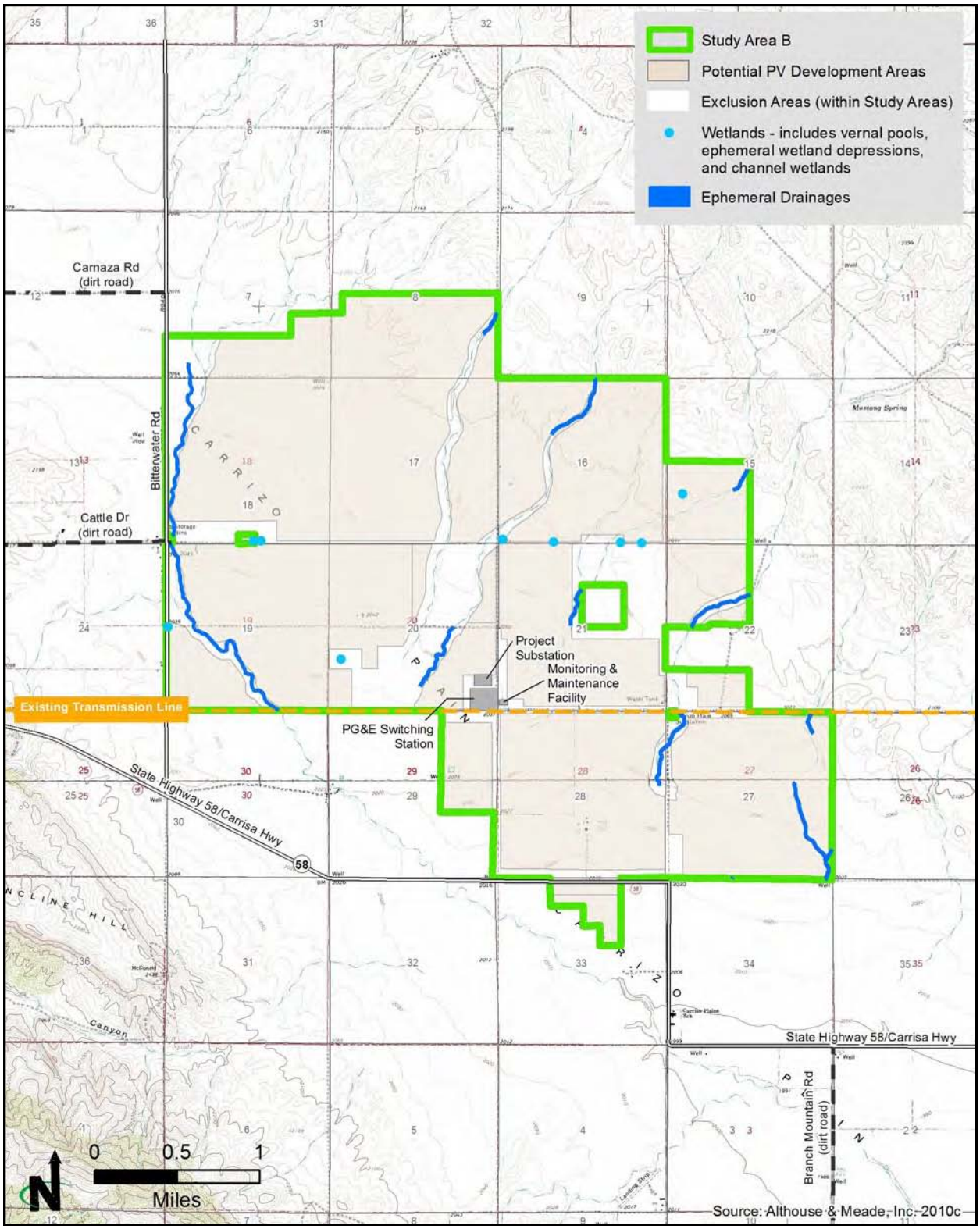


Under Alternative A, the Proposed Project would result in the permanent loss of less than 0.1 acre of jurisdictional Waters of the US.

Wetlands and Other Waters of the US–Study Area A

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-14

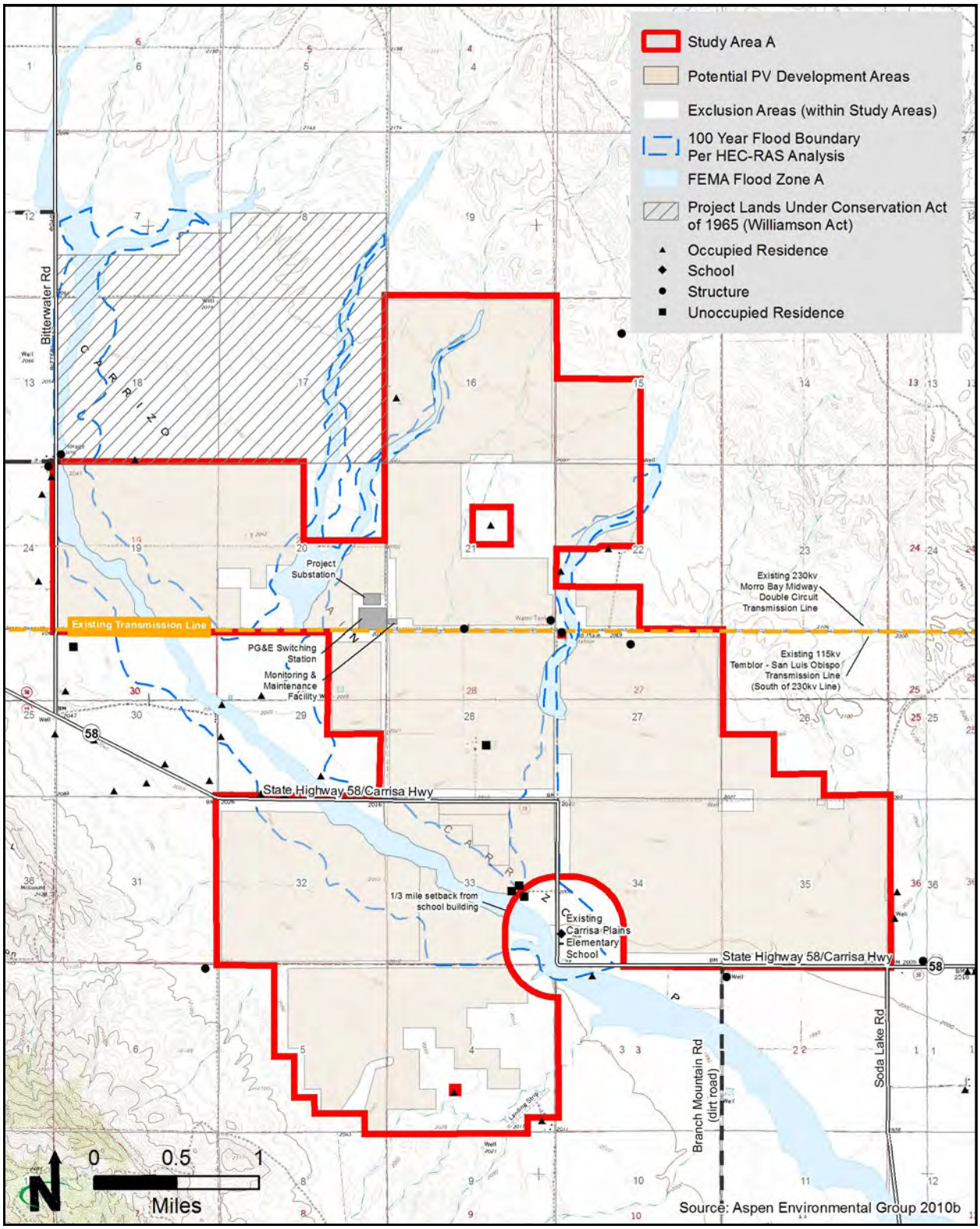


Under Alternative B, the Proposed Project would result in the permanent loss of less than 0.1 acre of jurisdictional Waters of the US.

Wetlands and Other Waters of the US–Study Area B

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-15

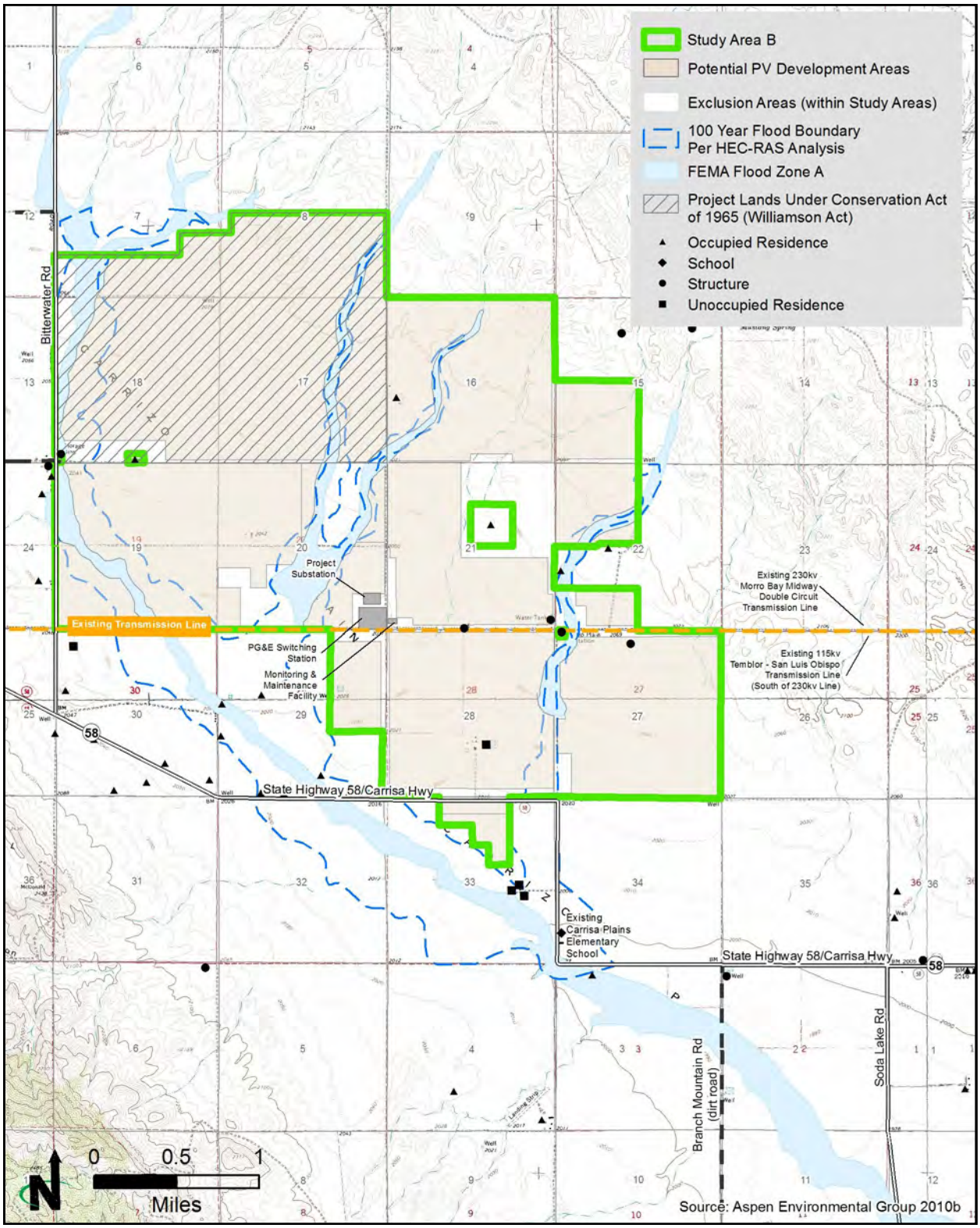


Mapped floodplains exist on the Project Site. Some of these areas are farmed, while others are crossed by paved and dirt roads.

Floodplains–Study Area A

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-16



Mapped floodplains exist on the Project Site. Some of these areas are farmed, while others are crossed by paved and dirt roads.

Floodplains–Study Area B

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-17

The safe yield for the basin has never been fully analyzed. Historic documents produced by the CDWR (1958) and Kemnitzer (1967) include estimates of safe yield based on very different approaches and, as a result, have vastly different conclusions, ranging from 600 acre-feet to 59,000 acre-feet. CDWR based its estimate on the assumption that the safe yield was equal to the consumptive use at that time, whereas Kemnitzer assumed the safe extraction of the full annual recharge rate for the basin, theorizing that excess waters pass out of the basin as underflow at its northern end into the adjacent Las Yeguas and the San Juan subsurface drainage areas. The Topaz Groundwater Report prepared for this Proposed Project explains that neither the CDWR nor the Kemnitzer involved adequate levels of effort to establish safe yield for the basin (Cleath-Harris Geologists, Inc. 2010). Based on more recent and realistic estimates of annual recharge and groundwater pumping, a reasonable estimate of annual safe yield of the Carrizo Plain Groundwater Basin is approximately 7,000 to 11,000 acre-feet per year (County of San Luis Obispo 2010a).

Separately, the preparers of the Topaz Groundwater Report conducted a determination of whether the basin is over-drafted as a whole (or even locally over-pumped) by looking at historic groundwater levels. Historical groundwater elevation data indicate that groundwater levels in the project area have been relatively stable for more than 20 years. Most wells display seasonal fluctuations in groundwater elevation, with short trends lasting up to a few years; such variations in groundwater levels are attributable to fluctuations in climate, precipitation, and pumping (URS 2009). The relative constancy of groundwater levels over time is considered sufficient evidence to demonstrate that the Carrizo Plain Groundwater Basin is not in overdraft conditions (Cleath-Harris Geologists, Inc. 2010).

Groundwater Uses

The US Environmental Protection Agency has identified no sole source aquifers within the Carrizo Plain Groundwater Basin (US Environmental Protection Agency 2010d).

Groundwater production volumes depend on the geologic formations underlying the basin. Shallow alluvial aquifers appear to produce water at rates of less than 50 gallons per minute, whereas aquifers in deeper geologic formations vary and are capable of production rates greater than 200 gallons per minute (Cleath-Harris Geologists, Inc. 2010).

Current water demand for the Carrizo Plain Water Planning Area is estimated at 900 to 1,120 acre-feet per year, with 210 acre-feet per year being for rural uses and 690 to 910 acre-feet per year being for agriculture (San Luis Obispo County 2010a). Agricultural development on the Carrizo Plain began prior to the 20th century, and many ranches utilized groundwater for stock watering and irrigated agriculture throughout the 20th century. From the 1950s to the 1980s, irrigation of alfalfa, potatoes, carrots and other truck crops occurred on the

Project Site (Cleath-Harris Geologists, Inc. 2010). Currently, agricultural land uses have been primarily grazing and dry farming of wheat and barley. Irrigation wells were typically pumped for a few months to support cultivation of spring hay (URS 2008a). Local residents indicate that pumping for irrigation has decreased substantially over the past 40 years (URS 2008a). Irrigation is not used on agricultural lands within the Project Site.

Groundwater Quality

Groundwater quality in the Carrizo Plain Groundwater Basin decreases to the east approaching the San Andreas Fault, and to the south toward Soda Lake. The highest quality water in the basin is locally understood to be west of Soda Lake Road in the deeper aquifers (Cleath-Harris Geologists, Inc. 2010). High nitrate and salinity concentrations are the main water management issues identified within the Carrizo Plain Basin (San Luis Obispo County 2001). Total dissolved solids (TDS) content in the Carrizo Plain Groundwater Basin are reported to range from approximately 161 to 94,750 milligrams per liter (mg/L), with a highly mineralized groundwater zone in the lower part of the alluvium and upper part of the Paso Robles Formation under Soda Lake (CDWR 2004).

The groundwater quality at the Project Site is generally suitable for agricultural and non-potable uses, as documented in the Cleath-Harris Geologists 2010 report. The use of groundwater for domestic purposes may require treatment to reduce certain mineral concentrations.

Throughout the Carrizo Plain Groundwater Basin, the main mineral constituent that exceeds MCLs for drinking water is nitrate. Water hardness is very high in some wells due to the solubility of calcic and gypsiferous sedimentary beds on the east side of the Carrizo Plain. Additionally, arsenic was detected in some wells at a concentration of 0.04 milligrams per liter, exceeding the MCL (Cleath-Harris Geologists, Inc. 2010). Treatment requirements depend on the specific water quality of each well's water and the type of use. For example, the groundwater from the well that was proposed to be used by the previously proposed Carrizo Energy Solar Farm is of poorer quality than other wells on the Project Site (Cleath-Harris Geologists, Inc. 2010) and would require more extensive treatment for potable use.

Susceptibility of Site to Ground Subsidence

Due to the density of the upper soils and shallow depth to the Paso Robles formation or the Santa Margarita formation at the site, the potential for seismically induced ground subsidence is considered to be low (ESSW 2010).

Study Area A

Study Area A contains 31 ephemeral drainages, totaling approximately 15 acres over 67,437 linear feet (Althouse and Meade 2010a). All ephemeral drainages were found to have surface water hydrologic connectivity to the main ephemeral drainage, which has a clear physical connection to Soda Lake, approximately 10 miles to the southeast (Althouse and Meade and Huffman-Broadway Group 2010). Figure 3-14 graphically depicts the locations of these drainages in relation to the Project boundaries. These ephemeral drainages fall under the jurisdiction of the USACE.

In addition, twenty jurisdictional wetland features, totaling 3.11 acres, have been documented as occurring throughout Study Area A, including vernal pools, ephemeral wetland depressions, and channel wetlands (Althouse and Meade and Huffman-Broadway Group 2010). These features are identified in **Table 3-13**, Jurisdictional Wetland Habitat Within Study Areas A and B, and depicted in Figure 3-14. Drainages and wetlands are currently impacted by land use practices on site, including ranching and farming.

Several portions of Study Area A include FEMA‑designated "Zone A" floodplains, which indicate areas with a one percent annual chance of being inundated during a storm ("100‑year flood"). The southwestern portion of Study Area A is traversed by a Zone A floodplain, surrounding the main ephemeral drainage described above.

Study Area B

Study Area B contains 12 ephemeral drainages occurring over approximately 31,742 linear feet within the limits of Study Area B (Althouse and Meade and Huffman-Broadway Group 2010). Jurisdictional wetland habitats identified in Study Area B, including vernal pools and ephemeral wetland depressions, are listed in Table 3-13 and depicted in Figure 3-15. Drainages and wetlands are currently impacted by land use practices on site, including ranching and farming.

Reconductoring

The existing PG&E 230-kV transmission line overlies the Carrizo Plain groundwater basin in the west and the San Joaquin Valley groundwater basin, Kern County sub-basin in the east. The transmission line crosses several agricultural canals, natural drainages, Salt Creek, and Temblor Creek. The portion of the reconductoring that occurs within the Project Site passes through a FEMA flood zone in the southern portion of Section 22. The remaining transmission line reconductoring impact area is not located in any floodplains.

TABLE 3-13
JURISDICTIONAL WETLAND HABITAT WITHIN STUDY AREAS A AND B

WETLAND TYPE	STUDY AREA A (ACRES)	STUDY AREA B (ACRES)	DESCRIPTION	VEGETATION
Vernal pool	2.51	0.10	Isolated pools occurring with soil characteristics presenting a shallow loamy soil up to 8" leading to a clay layer and containing known vernal pool vegetation.	hair grass (*Deschampsia danthonioides*), water starwort (*Callitriche marginata*), water pygmyweed (*Crassula aquatica*), mousetails (*Myosurus minimus, M. sessilis*), woolly marbles (*Psilocarphus brevissimus, P. chilensis*), inch-high rush (*Juncus uncialis*), pillwort (*Pilularia americana*), and alkali plagiobothrys (*Plagiobothrys leptocladus*)
Ephemeral wetland depression	0.56	0.62	Isolated pools not meeting the criteria for a vernal pool (i.e., lacking vernal pool specific plant species) but exhibiting wetland vegetation, hydric soils and wetland hydrology.	knotweed (*Polygonum arenastrum*), Oregon wooly marbles (*Psilocarphus oregonus*), neckweed (*Veronica peregrina*), adobe popcornflower (*Plagiobothrys acanthocarpus*), and pineapple weed (*Chamomilla suaveolens*).
Channel wetlands	0.04	0.00	Wetlands located within ephemeral drainages.	N/A
Total acreage	**3.11**	**0.71**		

Source: Althouse and Meade and Huffman-Broadway Group 2010; County of San Luis Obispo 2010a

3.7.2 Environmental Impacts

Potential impacts on water resources would occur if they resulted in one or more of the following:

- Alteration of surface water drainage patterns, resulting in increases in suspended sediment and turbidity in surface water drainages where the PV arrays, access roads, and associated facilities would be constructed;
- Release of pollutants other than sediment to the environment during construction, operation, and maintenance of the Project facilities;
- Changes in flow from springs and in surface water drainages;
- Changes in groundwater and/or surface water quality;
- Changes in groundwater recharge rates;

- Changes in groundwater levels and availability for other users;
- Changes in source water and vegetation at wetland areas;
- Reduction in floodplain capacity;
- Alteration of flood flows upstream or downstream of the Project;
- Flooding effects on proposed facilities; or
- Subsidence resulting from groundwater withdrawals.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Potential effects of construction on surface water, floodplains, wetlands, and Waters of the US, and groundwater are described below.

Effects on Water Quality. Disturbance of soils during construction could contribute to contaminated stormwater being generated at the Project Site, resulting in the degradation of the quality of downslope surface waters. A SWPPP would be prepared and implemented prior to construction as part of the Construction General Permit application. The SWPPP would outline specific stormwater control measures that would be implemented to reduce erosion, prevent the flow of sediment downstream, and prevent stormwater from entering waterways or affecting adjacent lands.

Accidental releases of hazardous materials from construction equipment, motorized vehicles, and drilling rigs could result in degradation of both surface water quality and groundwater quality. Potentially hazardous materials may include diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, lubricant grease, cement slurry, and other fluids. The following three measures would reduce this potential impact (see Geo-3, Haz-6, and Haz-3 in Table 2-9):

- The SWPPP would prescribe hazardous materials handling procedures for reducing the potential for a spill during construction and would include an emergency response program to ensure quick and safe cleanup of accidental spills. The SWPPP would identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, should occur.
- An environmental training program would be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, and SWPPP measures, to all field personnel. A monitoring program would be implemented to ensure that the plans are followed during all construction, operations, and maintenance activities.

- The Project Proponent would prepare and implement a Hazardous Materials Storage and Spill Response Plan to address management of hazardous materials during construction.

Effects on Waters of the United States. In arid regions, ephemeral drainages provide micro habitats for a variety of species and play an important role in conveying surface flows during storm events. Although this landform is relatively common in the Carrizo Plain, much of this habitat has been lost over the last several decades due to development near California Valley and historic agricultural practices.

Direct impacts on jurisdictional habitats could include the removal of native vegetation, the discharge of fill, degradation of water quality, and increased erosion and sediment transport. Because the project area is generally dry for most of the year and many of the existing ephemeral drainages are actively farmed, potential water quality impacts would be attenuated. Indirect impacts could include alterations to the existing topographical and hydrological conditions and the introduction of nonnative, invasive plant species.

All jurisdictional wetlands would be avoided and protected by buffers or setbacks ranging from 25 to 250 feet during construction (see Table 2-2). However, construction of road crossings and underground electrical collection system trenches would result in the permanent loss of less than 0.1 acre of jurisdictional ephemeral drainages (US Army Corps of Engineers 2010).

The Project Proponent would obtain required permits and certifications pursuant to Sections 401, 402, and 404 of the CWA, California Porter-Cologne Act, and California Fish and Game Code 1602. To comply with Section 404 of the CWA, mitigation is being determined through coordination and consultation with the USACE. Mitigation would ensure no net loss of wetlands, and impacts from erosion and sedimentation that could occur during road construction upslope of a jurisdictional waterway would be minimized. The Project Proponent has submitted a Clean Water Act Section 404 Individual Permit application to the USACE.

The Project Proponent proposes to compensate for the loss of ephemeral drainage habitat through in-kind habitat restoration of a portion of the main drainage at a minimum ratio of 2:1 (see WQ-1 in Table 2-9). This would rebuild a former portion of an aquatic resource, resulting in a gain in aquatic resource area and functions. The reestablished drainage area would be revegetated with native vegetation typical of drainages within the project area, and the reestablished habitat would provide improved functions compared to those of the impacted drainages. Implementing compensatory mitigation in the main drainage would expand its flood storage and desynchronization functions and would reduce flood damage by attenuating floodwaters following significant precipitation events. The main drainage would be protected from surrounding upland land use activities by an average 100-foot upland buffer. The mitigation

area and buffer would be protected from future development by a recorded conservation easement, and a non-wasting endowment fund would be established for long-term land management.

Effects on Floodplains. Road crossings and overhead and underground electrical collection lines would be installed in FEMA-designated Zone A floodplains under Alternative A. If the PV array development area is 4,100 acres, no arrays would be sited in floodplains. If a smaller PV development area is permitted by the County, PV arrays may be placed in floodplains so as to avoid impacts associated with development in grasslands. PV array posts would be spaced between 10 and 14 feet apart, and each support post would disturb flow in a zone that is approximately 1-square-foot in size. This level of disturbance would not be expected to raise base flood elevations or affect up- or downstream flow levels. The bottom of the panels would be installed 12 inches above the 100-year flood level to avoid the potential for damage to PV arrays.

The Proposed Project would use some existing and some new dirt and gravel roads to cross existing drainage channels. Low-water crossing would be designed to match the existing channel cross-sections and would have infiltration capability to avoid affecting channel hydraulics. To guard against scour, subsurface scour arrestors (rock-filled tranches) would be placed in appropriate locations.

The installation of trenches for underground electrical runs or poles supporting overhead electrical collection systems within the FEMA-designated floodplains is not expected to raise flood elevation or alter the direction of flood flows.

Effects on Groundwater Supply. Water would be required throughout the approximately three-year construction period for site preparation, localized grading and soil compaction in the PV array areas, compaction of building pads, road preparation, and dust control. Alternative A would require an average of 170,500 gallons per day during construction, with a maximum demand of 550,000 gallons per day for dust control during periods of greatest surface disturbance. This water supply would be provided through the pumping of groundwater from both existing and new water wells. Water would be pumped from the wells into temporary water storage basins located near the wells. Water trucks would draw water from these basins for dust control. New wells are preliminarily planned for the north center of Section 33, T29S, R18E and north center of Section 5, T30S, R18E; well depths and aquifer targets are not yet known (Cleath-Harris Geologists, Inc. 2010). As described in the Topaz Groundwater Study (2010), existing wells on the Study Area A site have the capacity to provide water for Alternative A demands, but new wells located in the various construction areas would also be used to reduce potential impacts (Cleath-Harris Geologists, Inc. 2010). The combination of new and existing wells would allow all water to be sourced within two miles of the area of use. The use of multiple wells would distribute the effect of water level lowering over a larger area, minimizing potential impacts at any one well.

Groundwater flow simulations were conducted as part of the Topaz Groundwater Study (Cleath-Harris Geologists, Inc. 2010). Groundwater level difference maps were produced, which compare "Project" with "No Project" conditions. Under Alternative A, maximum drawdown was observed in wells closest to Project wells, with water level interference decreasing as distance from the pumping wells increased. An existing irrigation well, located approximately 800 to 900 feet northwest of one of the Proposed Project wells, would experience up to seven feet of drawdown as a result of construction pumping during summer months, assuming that this new well would draw from the shallowest aquifer layers (less than 200 feet deep). Pumping Project water from deeper aquifers would result in less groundwater level interference (Cleath-Harris Geologists, Inc. 2010).

After construction, groundwater levels in wells near Project wells are projected to recover to pre-construction levels, with the rise in water levels during recovery being generally proportional to the extent of drop in the water levels from withdrawals during construction. For example, in the irrigation well that would experience up to seven feet of water level drawdown during initial construction activities, that water level would recover six feet four months after halting pumping activities. The rate of full recovery of Project-related drawdown would depend mainly upon precipitation rates in the area (Cleath-Harris Geologists, Inc. 2010).

Impacts on water supply for groundwater users outside of Study Area A would be minor and temporary since water levels are expected to recover within several months, given normal levels of average precipitation, after the three-year construction period is over.

Effects on Groundwater Recharge. The implementation of Alternative A would introduce 30 acres of temporary, construction-related features that could interfere with percolation of rainfall into the soil and, eventually, groundwater aquifers. These temporary areas would not be paved and would not permanently alter the existing ground cover or permeability of Study Area A. While in place, the presence of temporary features could result in localized redirection of natural groundwater recharge; however, such effects would be temporary and highly localized, affecting a negligible 0.75 percent of the maximum 4,100-acre development area. Additionally, runoff would largely be redirected to ephemeral drainages, where percolation may be greater.

Effects of Groundwater Withdrawal on Ground Subsidence. Due to the density of the upper soils and shallow depth to the Paso Robles formation or the Santa Margarita formation at the site, the potential for ground subsidence is considered to be low (ESSW 2010).

<u>Operation</u>. Potential effects of operation of the Proposed Project on surface water resources, including floodplains, wetlands, and other Waters of the US, and groundwater are described below.

Effects on Water Quality. Water quality could be impacted through hazardous material spills during operation and maintenance activities. Since the proposed solar farm would require limited amounts of hazardous materials, potential impacts would be limited to risks related to the presence and use of vehicles, which is consistent with existing risks typically associated with farming and other rural activities.

No impact on water quality is anticipated from the presence of CdTe PV modules, even if the modules are broken and components are exposed to the elements. This is further discussed in Section 3.15, Public Health and Safety and Hazardous Materials. No impacts on water quality are expected from other hazardous materials used in the operation and maintenance of the Proposed Project. Such materials and their proposed containment procedures are also discussed in Section 3.15. Operational effects on water quality would be negligible.

Effects on Waters of the US. Impacts on ephemeral drainages and floodplains during Project operation would be minor. Buffers or setbacks ranging from 25 to 250 feet would protect jurisdictional wetland features.

Effects on Groundwater Supply. Approximately 4,015 gallons per day, or up to 4.5 acre-feet per year would be required during operation of the Proposed Project. Operational water would be used primarily for sanitary purposes at the monitoring and maintenance facility and at the Solar Energy Learning Center, equipment and vehicle cleaning and maintenance at the monitoring and maintenance facility, and access road repair. The projected 4.5 acre-feet per year demand from the Proposed Project would represent approximately 0.4 to 0.5 percent of total existing demand within the Carrizo Plain Water Planning Area (San Luis Obispo County 2010b). Current demand, with or without the Project added, is well below the estimated safe yield for the Carrizo Plain Groundwater Basin of approximately 7,000 to 11,000 acre-feet per year. The Water Supply Assessment prepared for this Project as part of the Draft EIR process concluded that sufficient water supply would be available in the Carrizo Plain Groundwater Basin under varying climatic conditions for the lifetime of the Project.

Implementing Alternative A would reduce existing groundwater pumping associated with rural residential and stock-watering uses, resulting in a long-term net reduction in pumping and an associated rise in local groundwater elevations (Cleath-Harris Geologists, Inc. 2010). Therefore, the Proposed Project would not cause the Carrizo Plain Groundwater Basin to be in overdraft conditions, and would not result in substantial local groundwater level drawdown at wells in the area based on the groundwater flow model results.

No irrigation water would be necessary since no landscape screening would be established.

Effects on groundwater supply would be negligible to beneficial.

Effects on Groundwater Recharge. Permanent features that could redirect natural groundwater recharge include impervious footings, buildings and other structures, road improvements, and compaction. Earth disturbance under most PV arrays would be limited to vegetation mowing and/or grazing, loosening and smoothing of the top one to three inches of soil, and compacting the top four to six inches of soil. Compaction values in some areas would increase from the current range of 61 to 77 percent, to approximately 80 percent. This change would be localized and site-specific, and would not substantially redirect natural recharge to the Carrizo Plain Groundwater Basin, especially considering that much of the affected runoff would be redirected to ephemeral drainages where percolation may be greater. Effects on groundwater recharge would be negligible.

Effects of Groundwater Withdrawal on Ground Subsidence. Due to the density of the upper soils and shallow depth to the Paso Robles Formation or the Santa Margarita Formation at the site, effects on ground subsidence would be negligible.

Decommissioning. Impacts on ephemeral drainages and floodplains during decommissioning would be similar to those described for construction. Established buffers or setbacks would protect jurisdictional wetland features.

Effects on Water Quality. Disturbance of soils during dismantling of the PV modules and removal of on-site structures could contribute to contaminated stormwater being generated at the Project Site and resulting in the degradation of the quality of downslope surface waters. A SWPPP would be prepared and implemented prior to decommissioning as part of a Construction General Permit application. The SWPPP would outline specific stormwater control measures that would be required to reduce erosion, prevent the flow of sediment downstream, and prevent stormwater from entering waterways or affecting adjacent lands. In addition, accidental releases of hazardous materials from decommissioning equipment and motorized vehicles could result in degradation of both surface water quality and groundwater quality. Measures to reduce potential impacts would be similar to those described under construction.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Impacts on surface water from construction under Alternative B would be similar to those described for Alternative A.

Effects on Waters of the United States. Ephemeral drainages and jurisdictional wetlands are present in Study Area B (see Figure 3-15). All jurisdictional wetlands would be avoided and protected by buffers or setbacks ranging from 25 to 250 feet. Construction of road crossings and underground utility trenches

would result in the permanent loss of less than 0.1 acre of jurisdictional ephemeral drainages (US Army Corps of Engineers 2010).

The Project Proponent would obtain required permits and certifications pursuant to Sections 401, 402, and 404 of the CWA, California Porter-Cologne Act, and California Fish and Game Code 1602.

To comply with Section 404 of the CWA, mitigation is being determined through coordination and consultation with the USACE. The Project Proponent proposes to compensate for the loss of ephemeral drainage habitat through in-kind habitat restoration of a portion of the main drainage at a minimum ratio of 2:1. This would rebuild a former portion of an aquatic resource, resulting in a gain in aquatic resource area and functions. The reestablished drainage area would be revegetated with native vegetation typical of drainages within the Project Area, and the reestablished habitat would provide improved functions compared to those of the impacted drainages. Implementing compensatory mitigation in the main drainage would expand its flood storage and desynchronization functions and would reduce flood damage by attenuating floodwaters following significant precipitation events. The main drainage would be protected from surrounding upland land use activities by an average 100-foot upland buffer. The mitigation area and buffer would be protected from future development by a recorded conservation easement, and a non-wasting endowment fund would be established for long-term land management.

Effects on Floodplains. Road crossings and overhead and underground electrical collection lines would be installed in FEMA-designated Zone A floodplains under Alternative B; no arrays would be sited in floodplains. As discussed under Alternative A, minor development in floodplains is not expected to raise base flood elevation or affect upstream or downstream flows.

Effects on Groundwater. Construction impacts under Alternative B on groundwater supply, groundwater quality, groundwater recharge, and subsidence due to groundwater withdrawal would be similar to those described under Alternative A.

Operation. Impacts on surface water and floodplains during Project operation would be minor, as described under Alternative A. The remaining jurisdictional wetland features would be avoided and protected by buffers or setbacks ranging from 25 to 250 feet. Operational impacts under Alternative B on groundwater supply, groundwater quality, groundwater recharge and subsidence due to groundwater withdrawal would be as described for operation of Alternative A.

Decommissioning. Impacts on water resources during decommissioning would be the same as described for Alternative A. Jurisdictional wetland features would be avoided and protected by buffers or setbacks ranging from 25 to 250 feet.

Reconductoring

The PG&E Reconductoring Project could result in impacts on surface water, groundwater, and floodplains and includes the potential for water quality degradation. Following reconductoring project approval, PG&E would prepare and implement a SWPPP to minimize construction impacts on surface and groundwater quality. Implementation of the SWPPP would help stabilize graded areas and waterways and would reduce erosion and sedimentation. The plan would designate best management practices that would be adhered to during construction activities. Erosion and sediment control measures would be installed before the onset of winter rains or any anticipated storm events. Mulching, seeding, or other suitable stabilization measures would be used to protect exposed areas during construction activities, as necessary. During construction, measures would be in place to ensure that contaminants are not discharged from the construction sites.

Impacts on water resources from operations would be negligible.

No Action Alternative

Under the no action alternative, current impacts on surface water and groundwater caused by land use practices such as ranching and farming would continue. No additional impacts on water quality, jurisdictional drainages, wetlands, floodplains or groundwater quantity would be expected.

3.8 VEGETATION

3.8.1 Affected Environment

This section addresses the affected environment and environmental consequences of the Project on vegetation communities within the Project Site. A vegetation community is an assemblage of individual plant species that grows together in the same general geographic location. Individual special status plant species are addressed in Section 3.10, Special Status Species.

Regulatory Framework

Clean Water Act

The Clean Water Act (CWA) established the basic structure for regulating discharges of pollutants into Waters of the US, including setting water quality standards for all contaminants in surface waters. Under Section 401, the CWA made it unlawful for any person to discharge any pollutant from a point source into Waters of the US unless a National Pollutant Discharge Elimination System water quality certification permit was obtained. Permits under Section 401 are generally issued by the state in which the activity is proposed. For discharge of dredged or fill material into Waters of the US, including wetlands, a Section 404 permit from the USACE is required.

Federal Noxious Weed Act of 1974
The Federal Noxious Weed Act of 1974 provides for the control and management of nonindigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. The Act prohibits importing or moving any noxious weeds identified by the regulation and allows for inspection and quarantine to prevent the spread of noxious weeds.

Executive Order 13112, Invasive Species
Signed in 1999, Executive Order 13112 directs federal agencies to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. To accomplish this, the Executive Order established the National Invasive Species Council; currently there are 13 departments and agencies represented on the council.

California Native Plant Protection Act of 1977; California Fish and Game Code §1900 et seq.
This law includes provisions that prohibit the taking of listed rare or endangered plants from the wild. The law also includes a salvage requirement for landowners. Furthermore, it gives the California Department of Fish and Game (CDFG) the authority to designate native plants as endangered or rare and provides specific protection measures for identified populations.

Noxious Weeds Management; California Food and Agriculture Code § 7270-7224
This code designates the Department of Food and Agriculture as the lead department in noxious weed management for the state of California. It creates a Noxious Weed Management Account for the control and abatement of noxious weeds. Money in the account can be used to directly control noxious weeds; fund research on the biology, ecology, or management of noxious and invasive weeds; develop noxious weed control strategies; seek new, effective biological control agents for the long-term control of noxious weeds; conduct private and public workshops to discuss and plan weed management strategies; and appoint a noxious weed coordinator and weed mapping specialist to assist in weed inventory, mapping, and control strategies.

Methods
Floristic surveys were conducted within portions of the Project Site from 2007 through 2010 (URS 2008b, Althouse and Meade 2010b). The 2010 survey encompassed all 9,700 acres of the Project Site, documented all plants on site, including nonnative species, and characterized habitat types.

Biological surveys were conducted on foot, by all-terrain vehicles, and using aerial photographs in order to compile species lists, map habitats and drainages, and characterize habitats on the Project Site. The entire Project Site was surveyed. Botanical surveys conducted on the Project Site were consistent with

botanical survey protocols published by the CDFG (CDFG 2009) and California Native Plant Society (CNPS) (CNPS 2001). Surveyors utilized both transect and focused survey methods, and identification of botanical resources included field observations and laboratory analysis of collected material. A more detailed description of survey methods is presented in Appendix E, Biological Resources.

Noxious weeds are defined in the Federal Noxious Weed Act as "any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind which is of foreign origin, is new to or not widely prevalent in the US, and can directly or indirectly injure crops, other useful plants, livestock, poultry or other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or the public health."

Nonnative plant species are those species that evolved in one region of the globe but were moved by humans to another region. Often, these species thrive in the new environment and crowd out native vegetation and the wildlife that feed on it. Some nonnative species can even change ecosystem processes such as hydrology, fire regimes, and soil chemistry. These plants have a competitive advantage and can quickly spread in new territories because they are no longer controlled by their natural predators (Cal-IPC 2010).

General Project Area

Floristic surveys conducted from March 2008 through July 2010 identified 248 species, subspecies, and varieties of vascular plants within the Project Site (Althouse and Meade 2010b). The list includes 160 species native to California and 88 nonnative species.

All habitats within the Project Site have been altered by past farming and ranching operations, and no habitats within the Project Site remain in their natural condition. Land management practices have removed any prior shrub vegetation and have converted natural grassland systems to rangeland and farmland dominated by introduced species (Althouse and Meade 2010b).

Table 3-14, Habitat Acreages on the Project Site, provides habitat acreages for the entire Project Site by study area. The Proposed Project would be constructed in either Study Area A or Study Area B, and only a portion of the study area would be developed (up to 4,100 acres in Study Area A and up to 4,000 acres in Study Area B). **Figure 3-18**, Habitat shows habitat types on the Project Site.

TABLE 3-14
HABITAT ACREAGES ON THE PROJECT SITE

HABITAT TYPE	PROJECT SITE (ACRES)	STUDY AREA A (ACRES)	STUDY AREA B (ACRES)
Cropland	6,205	4,380	4,712
California Annual Grassland	3,463	3,356	1,689
Vernal Pool	2.5	2.5	0.1
Ephemeral Wetland Depression	0.7	0.6	0.6
Natural Non-wetland Pool	1.1	1.0	0.2
Anthropogenic Non-wetland Pool	0.77	0.7	0.1
Agricultural Reservoir	0.04	0.04	0.04
Anthropogenic Habitat	28	23	25

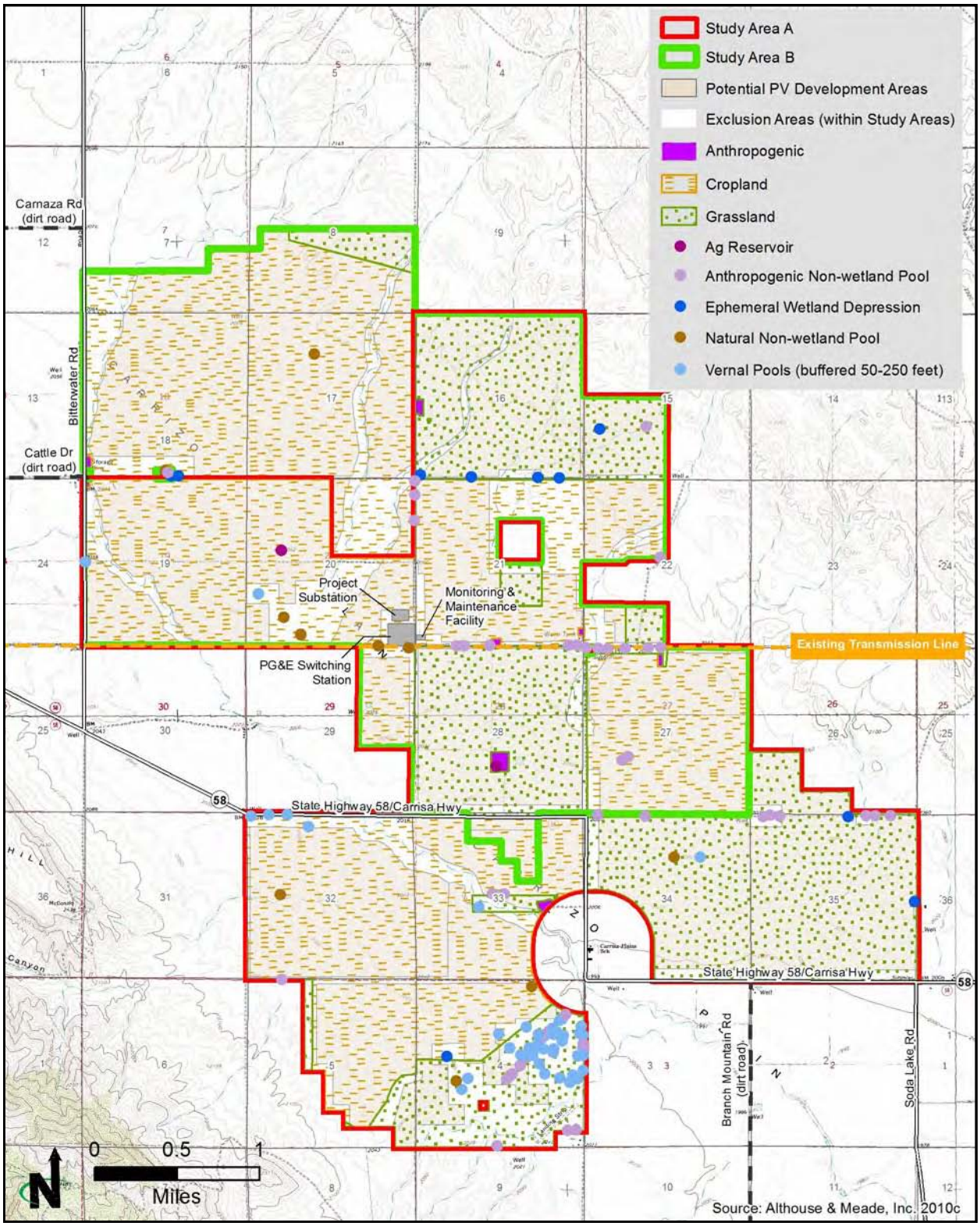
Source: Althouse and Meade 2010b

Cropland

Cropland habitat consists of dry-farmed (non-irrigated) land, and covers approximately 6,205 acres, or 64 percent, of the Project Site. This habitat type includes fields planted with grain and fields left bare or fallow during rotation. Certain parcels remain fallow during the summer, when farmland is taken out of production for up to 14 months to allow soil moisture to accumulate. Grain crops (e.g., barley, oats, and wheat) are planted in alternate years and harvested for grain. The remaining stubble is used for cattle grazing. Herbicides are regularly used to control weeds in planted fields. Cropland habitat supports few native plant species (Althouse and Meade 2010b).

California Annual Grassland

Annual grassland habitat encompasses approximately 3,463 acres, or 36 percent, of the Project Site. This seasonal habitat is dry in summer, and consists of native and nonnative low-lying annual grasses and forbs (non-woody flowering plants). The relative cover of native and nonnative grasses and forbs varies throughout the Project Site. Some lands within the Project Site, located on all or a portion of Sections 4, 5, 8, 26, 34, and 35, are in the Conservation Reserve Program (CRP) and have been untilled for at least 20 years. These areas generally show relatively high native forb diversity and abundance. Some areas of the Project Site, such as Sections 16 and 28 (found in both study areas), were removed from farming within the last 5 to 7 years. These grasslands are predominantly composed of introduced annual grasses and support a lower diversity of native forbs and grasses (Althouse and Meade 2010b).



Floristic surveys of the Project Site identified 160 species native to California and 88 nonnative species.

Habitat

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-18

Early season vegetation in all grasslands within the Project Site is dominated by redstem filaree (*Erodium cicutarium*), an introduced species. Later in the season, CRP lands develop large areas of native annual fescue (*Vulpia microstachys*) with nonnative soft chess brome (*Bromus hordeaceus*) and introduced annual fescue (*Vulpia myuros*). In addition, native wildflowers such as coastal tidy tips (*Layia platyglossa*), miniature lupine (*Lupinus bicolor*), owl's clover (*Castilleja* spp.), and common goldfields (*Lasthenia gracilis*) are common to abundant. Other native forbs common in the CRP grasslands are silverpuffs (*Microseris* spp., *Uropappus lindleyi*, and *Stebbinsoseris heterocarpa*), hill lotus (*Lotus humistratus*), and red maids (*Calandrinia ciliata*) (Althouse and Meade 2010b).

Fallow agricultural fields that have recently reverted to annual grasslands tend to be dominated by introduced annual grasses such as wild oats (*Avena fatua*), soft chess brome, introduced annual fescue, and foxtail barley (*Hordeum murinum*). Common and sometimes abundant native wildflowers include the native Great Valley phacelia (*Phacelia ciliata*) and several species of fiddleneck (*Amsinckia menziesii*, *A. lycopsoides*, and *A. tessellata*) (Althouse and Meade 2010b).

Vernal Pool

Vernal pools are a type of wetland that is subject to regulation under the CWA and analogous state laws and regulations. The US EPA describes vernal pools as "seasonal depressional wetlands that occur under the Mediterranean climate conditions of the West Coast. They are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall. These wetlands range in size from small puddles to shallow lakes and are usually found in a gently sloping plain of grassland. Although generally isolated, they are sometimes connected to each other by small drainages known as vernal swales. Beneath vernal pools lies either bedrock or a hard clay [or mineral] layer in the soil that helps keep water in the pool."

Vernal pools onsite occur in topographic depressions that are outside the ephemeral drainages and do not, under normal circumstances, experience flow of water. Forty-seven vernal pools occur within the Project Site, covering approximately 2.5 acres (Althouse and Meade 2010b).

Vegetation within vernal pools is characterized by a suite of plant species strongly affiliated with this habitat type in the region, including hair grass (*Deschampsia danthonioides*), water starwort (*Callitriche marginata*), water pygmyweed (*Crassula aquatica*), mousetails (*Myosurus minimus, M. sessilis*), woolly marbles (*Psilocarphus brevissimus, P. chilensis*), inch-high rush (*Juncus uncialis*), pillwort (*Pilularia americana*), and alkali plagiobothrys (*Plagiobothrys leptocladus*). Typically a vernal pool would contain several of these species (Althouse and Meade 2010b).

Surveyors classified vernal pools using several systems, including the Manual of California Vegetation (Althouse and Meade 2010b; Sawyer and Keeler-Wolf 1995). While vernal pools observed on the Project Site do not necessarily fit any of the described vernal pool "types," they do qualify as vernal pools based on the type of vegetation, soils, and geographic location, and should be regarded as sensitive habitat types (see *Sensitive Communities*) (Althouse and Meade 2010b).

Ephemeral Wetland Depression

Some isolated pools, described as ephemeral wetland depressions, do not meet criteria for vernal pools, although they do support wetland vegetation and have hydric soils and wetland hydrology. These pools have a total area of 0.70 acre. Typical vegetation generally forms approximately 50 percent or less total plant cover, dominated by stunted specimens of an ephemeral annual, Oregon woollyheads (*Psilocarphus oregonus*); a common weed, knotweed (*Polygonum arenastrum*); adobe allocarya (*Plagiobothrys acanthocarpus*); and wandering speedwell (*Veronica peregrina*). Surrounding habitat consists of annual grassland. Ephemeral wetland depressions are not considered vernal pools because they lack plant species with high fidelity to vernal pools in the vicinity. Ephemeral wetland depressions on the Project Site vary in size from approximately 500 square feet to nearly 7,000 square feet. Vegetation growth in these shallow depressions was not vigorous and their areal extent was sparse compared to surrounding plant cover (Althouse and Meade and Huffman-Broadway Group 2010).

Natural Non-Wetland Pool

Numerous naturally occurring pools within the Project Site do not meet wetland criteria due to an absence of hydric soils or the non-dominance of wetland vegetation. The pools occupy approximately one acre within the Project Site. Some wetland plant species, such as alkali plagiobothrys, adobe allocarya, and Oregon woollyheads, are present in low quantities but do not dominate the plant cover. Upland species are present in equal or greater quantities, including valley popcornflower (*Plagiobothrys canescens*), pineapple weed, redstem filaree, and Douglas' silverpuffs (*Microseris douglasii* ssp. *douglasii*). In Section 20, cultivated barley, while stunted (an indication of wetland conditions), continues to grow as one of the dominant species in the non-wetland pools observed, whereas in vernal pools in Section 20, this saturation-intolerant species is absent (Althouse and Meade 2010b).

Anthropogenic Non-Wetland Pool

Use of unpaved roads during the wet season has generated many ruts and depressions within the roadways that, while not meeting the criteria for wetlands, do pool with water. These pools occupy approximately 0.77 acre of the Project Site. They are different from naturally occurring non-wetland pools because they are more transitory in nature, with pools being created or enlarged during the wet season and eliminated during regular road maintenance

in the dry season. Some wetland plant species, such as adobe allocarya and Oregon woollyheads, are present in low quantities (often less than five percent total cover) but do not dominate plant cover. Upland plant species are present in equal or greater quantities, including pineapple weed and peppergrass (*Lepidium nitidum* var. *nitidum*) (Althouse and Meade 2010b).

Agricultural Reservoir

Four agricultural reservoirs are located within the Project Site. Two of the reservoirs, found in Sections 28 and 29, are dilapidated and no longer capable of holding ponded water, and therefore are not considered potential aquatic habitat (Figure 3-18). These are not indicated on the habitat map. The remaining two reservoirs, one in Section 20 and one in Section 28, hold water in the rainy season and are indicated on the habitat map (Figure 3-18) (Althouse and Meade 2010b).

Anthropogenic Habitat

All areas within the Project Site that are heavily influenced by human development are mapped and described as anthropogenic habitat (Figure 3-18). Anthropogenic habitat includes abandoned and occupied ranch compounds and associated structures. Approximately 28 acres of anthropogenic habitat occurs within the Project Site. Several of the ranch compounds are planted with ornamental trees and shrubs, which create areas of tree canopy and shrub understory that are otherwise lacking in the vicinity (Althouse and Meade 2010b).

Noxious Weeds and Nonnative Species

No federally listed noxious weeds were recorded within the Project Site, though California-listed noxious weeds do occur (California Department of Food and Agriculture 2010).

Nonnative annual vegetation is found throughout California where cultivation and grazing for the past century or more has converted native annual or perennial grasslands to nonnative annual grasslands. Eighty-eight nonnative species were recorded within the Project Site. Examples of some of the most common nonnative species include tumbleweed (*Amaranthus albus*), shepherd's purse (*Capsella bursa-pastoris*), tansy mustard (*Descurainia sophia*), slender wild oat, foxtail barley, and Mediterranean grass (*Schismus arabicus*) (Althouse and Meade 2010b).

Sensitive Communities

Vernal pools are a valuable and increasingly threatened ecosystem, as more than 90 percent of California's vernal pools have been destroyed (EPA 2010b). They provide a unique environment for plants and animals, since they are flooded in the winter, moist in the spring, and dry through summer and fall. Over 200 species of plants can be present in California's vernal pools; half are entirely restricted to this habitat type (Witham 2006). Numerous rare plants and

animals are able to survive and thrive in these conditions. Many of these organisms spend the dry season as seeds, eggs, or cysts, and then grow and reproduce when the ponds are again filled with water. Birds such as egrets, ducks, and hawks use vernal pools as a seasonal source of food and water (EPA 2010b). As discussed under *Vernal Pool*, vernal pool habitat covers approximately 2.5 acres of the Project Site (Althouse and Meade and Huffman-Broadway Group 2010).

Study Area A

Cropland

Cropland within Study Area A is similar to that described for the general project area. Study Area A includes approximately 4,380 acres of cropland.

California Annual Grassland

Annual grassland within Study Area A is as described previously for the general project area and includes approximately 3,356 acres of annual grassland. CRP lands within Study Area A that have been untilled for at least 20 years and show high native forb diversity and abundance include all or portions of Sections 4, 5, 26, 34, and 35.

Vernal Pool

Vernal pool habitat within Study Area A is similar to that described previously for the general project area. Forty-seven vernal pools occur within Study Area A, with a vernal pool/upland habitat area in Section 4 and vernal pools scattered throughout Sections 19, 20, 32, and 35 (Figure 3-18). Vernal pool habitat covers approximately 2.5 acres within Study Area A (Althouse and Meade 2010b).

Within Study Area A, several pools in Sections 4 and 35 have not been farmed for 20 years or more, and several pools in Sections 19, 20, and 32 have been regularly disturbed by farming activities in the last two years. Pools in Sections 19 and 20 were planted with barley in 2010; pools in Section 32 were fallow for two years and then plowed in 2010. Despite plowing and planting activities in 2009 and 2010, these pools support several of the vernal pool plant species listed for the Project Site (Althouse and Meade 2010b).

Ephemeral Wetland Depression

Ephemeral wetland depression habitat within Study Area A is as described previously for the general project area. Within Study Area A, this habitat occurs in Sections 4, 15, 16, and 35, covering 0.6 acre.

Natural Non-Wetland Pool

Natural non-wetland pools within Study Area A are similar to those described for the general project area. Within Study Area A, the pools are located in Sections 4, 15, 20, 29, 32, and 34, covering one acre.

Anthropogenic Habitat
Anthropogenic habitat within Study Area A is similar to that described for the general project area. Within Study Area A, this habitat occurs in Sections 16, 21, 22, 28, and 33.

Study Area B

Cropland
Cropland within Study Area B is similar to that described for the general project area. Study Area B includes approximately 4,712 acres of cropland habitat. Section 8 includes CRP lands within Study Area B that have been untilled for at least 20 years and show high native forb diversity and abundance.

California Annual Grassland
Annual grassland within Study Area B is similar to that described for the general project area and includes approximately 1,689 acres of annual grassland.

Vernal Pool
Vernal pool habitat within Study Area B is as described previously for the general project area. Two vernal pools, covering approximately 0.1 acre, are located within Study Area B (Figure 3-18) (Althouse and Meade 2010b). Within Study Area B, Sections 19 and 20 contain vernal pools that have been regularly disturbed by farming activities in the last two years; they were planted with barley in 2010. Despite plowing and planting activities in 2009 and 2010, these pools support several of the vernal pool plant species listed above (Althouse and Meade 2010b).

Ephemeral Wetland Depression
Ephemeral wetland depression habitat within Study Area B is as described previously for the general project area. Ephemeral wetland depressions occur in Sections 15, 16, and 18, covering 0.6 acre.

Natural Non-Wetland Pool
Natural non-wetland pools within Study Area B are similar to those described for the general project area. The pools are located in Sections 15, 17, 20, and 29, covering 0.2 acre.

Anthropogenic Habitat
Anthropogenic habitat within Study Area B is similar to that described for the general project area. This habitat type occurs in Sections 16, 18, 21, 22, 28 and 33.

Reconductoring
The PG&E Reconductoring Project would affect a greater number of vegetative communities compared with the Proposed Project. The Morro Bay to Midway transmission line spans 35 miles, crossing a greater geographic area, from San

Luis Obispo County to Kern County, and ranging from near sea level to 1,000 feet above mean sea level.

Similar to the Proposed Project, annual grassland is a common vegetation community along the reconductoring route. Cropland also occurs, mainly in the eastern portion of the route. In addition, the saltbush scrub community occurs throughout the reconductoring route, but is mainly found within the lower, eastern portion of the reconductoring route, east of the Temblor Range. This vegetation community is dominated by allscale (*Atriplex polycarpa*), which is a perennial shrub that reaches an average height of 3 to 6 feet. Oak woodland and California juniper woodland are less common. Oak woodland occurs in the Temblor Range and is dominated by Tucker's oak (*Quercus john-tuckeri*). California juniper woodland also occurs within the Temblor Range, and is dominated by California juniper (*Juniperus californica*).

3.8.2 Environmental Impacts

Potential impacts on vegetation and important habitats would occur if the proposed action were to result in the following:

- Affect a plant species, habitat, or natural community recognized for ecological, scientific, recreational, or commercial importance;
- Affect a species, habitat, or natural community that is specifically recognized as biologically significant in local, state, or federal policies, statues, or regulations;
- Destroy or extensively alter habitats or vegetation communities in such a way that would render them unfavorable to native species; or
- Establish or increase noxious and/or nonnative, invasive weed populations.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. As a conservative calculation, it is assumed that all fenced areas, roads outside of fences, and the Solar Energy Learning Center would cause permanent impacts on vegetation, except for vernal pool habitats, which would be avoided using a minimum setback of 50 feet. The Proposed Project would result in the long-term removal of vegetation associated with the substation, switching station, monitoring and maintenance facility, Solar Energy Learning Center, piles, fence posts, structures, and gravel roads. Temporary removal of vegetation would occur during construction associated with laydown/staging areas, trenching for underground cables, and areas that would be graded to reduce slopes as required for PV array installations. While the response of vegetation underneath PV arrays is not yet well documented, preliminary vegetation tests within the Project Site indicate that PV modules would

ameliorate extreme soil temperatures and allow grasses to grow longer due to an improved moisture regime under PV arrays compared to open fields. Further, shading may benefit native perennial bunchgrass species, such as nodding needlegrass (*Nassella cernua*) (Althouse and Meade 2011). Adaptive management is proposed with the goal of providing grassland habitat under PV arrays similar to that which currently exists on site. **Table 3-15**, Habitat Impacts – Alternative A provides acreages and impacts for vegetation communities within the study area and the Project development area.

TABLE 3-15
HABITAT IMPACTS – ALTERNATIVE A

HABITAT TYPE	TOTAL ACRES WITHIN STUDY AREA A	PERMANENT IMPACTS[1] (MAXIMUM ACRES AFFECTED)
Cropland	4,380	2,388
California annual grassland	3,356	1,721
Vernal pool	2.5	0
Ephemeral wetland depression	0.6	0
Natural non-wetland pool	1.0	~2,640 sq. ft. (0.06 acres)
Anthropogenic non-wetland pool	0.7	~3,600 sq. ft. (0.08 acres)
Agricultural reservoir	1,742 sq. ft. (0.04 acres)	1,742 sq. ft. (0.04 acres)
Anthropogenic habitat	23	0

Source: Althouse and Meade 2010b
[1] All areas within Project fencing, roads outside of fences, monitoring and maintenance facility, substation, and switching station. Acreages listed are for a 4,100-acre Project; the area of permanent impact would be less under a reduced acreage development scenario.

Cropland habitat within the Project Site would decrease, as the site would no longer be used for agriculture. Much of this acreage would be converted to annual grassland habitat, since vegetation between and beneath arrays would be adaptively managed to be dominated by annual grasses. As a result, the Project Site may result in a net increase in annual grassland habitat through elimination of seasonal tilling, and subsequent management for grassland species. A vegetation management plan would be developed to control plant height and invasive species.

Construction of the Proposed Project could result in modification of the hydrological regime critical to vernal pool and ephemeral wetland depression inundation in Study Area A. The Project Proponent would implement permanent setbacks around vernal pools and ephemeral wetland depressions that would protect hydrologic function. With avoidance of vernal pools and ephemeral wetland depressions, the Project would not result in adverse impacts on seasonal wetland and vernal pool habitat. In addition, several vernal pools and ephemeral wetland depressions have been severely degraded by the current

farming operations and, to a lesser extent, overgrazing. The Project could result in a beneficial effect on these vernal pool and ephemeral wetland habitats, as these habitats would no longer be subjected to adverse farming effects, particularly plowing, as well as overgrazing, and would not be affected by the Proposed Project. Conversion of plowed and heavily-grazed lands to passive solar uses would result in a beneficial effect on ephemeral wetland depressions in Study Area A. Carefully managed grazing as proposed in the Draft Vegetation Management Plan (Althouse and Meade 2011) would be implemented and could result in increased species diversity in vernal pools and ephemeral wetland depressions (Marty 2004).

Three natural non-wetland pools contain confirmed or potential listed fairy shrimp species, and these features would be protected by permanent 250-foot setbacks. Impacts on special status species are discussed in Section 3.10, Special Status Species. Other natural non-wetland pools would experience negligible adverse effects from shading, trenching, grading, or installation of PV array mounting posts. Cessation of farming would result in a beneficial impact on those natural non-wetland pools that are located within existing cropland habitat.

Except where special status species could be affected, the Proposed Project may result in filling of anthropogenic non-wetland pools during road improvement and maintenance activities. This is not expected to cause adverse effects on biological resources because this habitat type does not provide high quality habitat for wildlife or special status species.

Soil disturbance during construction, such as grading, as well as plant removal could indirectly facilitate the invasion or spread of nonnative, invasive, or noxious weeds. Further, humans and vehicles accessing the site could inadvertently carry weed seeds on their clothing, shoes, tires, and on the undercarriage of vehicles. While nonnative species are widespread within the Project Site and comprise 35 percent of the total number of species, a large increase in this percentage or in weedy plant cover would constitute a substantial adverse effect. Invasive weeds could outcompete native species for resources such as water, nutrients, light, and space. This could result in a change in the vegetation structure and ecological function of the vegetation community. The draft Vegetation Management Plan includes weed prevention and control measures to reduce the likelihood for the spread of invasion of weeds (Althouse and Meade 2011).

Soil disturbance could also cause the loss of soil nutrients and topsoil through erosion. This could make on-site revegetation less successful and increase the likelihood of weed invasion. Furthermore, soil compaction caused by vehicles and workers on site could reduce water infiltration and make revegetation efforts unsuccessful.

The majority of the site would not need to be graded as part of the construction process, which would reduce surface disturbance and the likelihood for weed invasion or spread. The ground may be harrowed or plowed, and rolled to create an even surface for placement of the PV x arrays, which would constitute less surface disturbance than grading. Grading may occur to construct access roadways, the staging areas, the substation, switching station, other structures, and to reduce slopes where needed for PV array installation. Trenching would be required for installation of underground cables.

Dust during construction could cover existing vegetation, which could affect plant photosynthesis and respiration. Impairment of these functions could lower plant vigor, growth rate, and increase a plant's susceptibility to disease, causing long-term moderate effects.

The measures that have been incorporated into the Proposed Action to reduce impacts on vegetation are summarized below (see Table 2-9). In addition, best management practices (BMPs) would be followed to further reduce impacts from construction. These BMPs have been included in Appendix E.

- Prepare a vegetation management plan that would specify grazing standards, weed management, residual vegetation quantities, and land management practices compatible with facility management and wildlife use. A draft Vegetation Management Plan has been prepared for the Project (Althouse and Meade 2011).
- Avoid ephemeral wetland depressions. Establish a 25-foot setback with orange fencing to protect wetland hydrologic regimes and allow seasonal wildlife access to the pools.
- Avoid vernal pools. Establish a 50-foot setback with orange fencing to protect vernal pool hydrologic regimes and allow seasonal wildlife access to the pools.
- Avoid federally listed fairy shrimp pools. Establish a 250-foot setback with orange fencing to protect vernal pool hydrologic regimes.
- Provide dust control in accordance with San Luis Obispo County Air Pollution Control District requirements during Project construction. The primary access roads would be treated with gravel or other road stabilization material, and disturbed areas would be managed for dust regularly.
- Erosion control measures would be implemented during Project construction activities to prevent the flow of sediment downstream.
- A biological monitor would inspect the site during all construction activities. The monitor would be responsible for ensuring that impacts on native vegetation, wildlife habitat, or unique resources

would be avoided to the fullest extent possible. Where appropriate, monitors would flag the boundaries of areas where activities would need to be restricted in order to protect native plants or sensitive habitats. Those restricted areas would be monitored to ensure their protection during construction.

- Prior to construction activities, a worker environmental awareness program would be prepared. All construction crews and contractors would be required to participate in the worker environmental awareness program prior to starting work on the Project. The program would include a review of the special status species and other sensitive resources that could exist on the Project Site, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel would be maintained.
- A habitat restoration and revegetation plan would be implemented, detailing revegetation methods, monitoring and reporting requirements, and success criteria. Requirements for the habitat restoration and revegetation plan would be described in the EIR.

In addition, the County of San Luis Obispo may require compensation for permanent impacts on certain vegetative communities. These requirements would be described in the EIR. Provided that the lands acquired or protected for the compensation of permanent impacts on San Joaquin kit fox and listed or rare plants (see Section 3.10, Special Status Species) contain the same and/or better habitat as the impacted vegetation communities, the 1:1 ratio would be achieved through the acquisition or other protection of lands for those species, and no further acquisition would be required for permanent impacts on certain vegetation and these lands, if required, would be part of the special status species compensation discussed in Section 3.10.

Operation. No direct effects on vegetation are expected from operation and maintenance of the Proposed Project. A vegetation management plan, to potentially include grazing, would be implemented during Project operation to control plant height and invasive species.

Indirect effects from operation and maintenance of the Proposed Project would be less than those described previously from construction. Even so, workers and vehicles accessing the site could introduce or spread weeds into the area over time.

Presence of the PV modules could change the light and hydrological regimes beneath and surrounding the arrays. This could cause changes in soil moisture and temperature, which could change the value of the habitat for wildlife.

Decommissioning. Impacts from decommissioning would be similar to those from construction of the Project, as ground disturbance would occur and vehicles and personnel on-site would increase for a period of time. Measures to reduce impacts on vegetation would be implemented; these measures would be expected to be similar to those described for construction.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Impacts on vegetation from construction of Alternative B would be similar to those described for Alternative A. Impacts would differ according to the acreage of temporary and permanent disturbance, as shown in **Table 3-16**, Habitat Impacts – Alternative B.

TABLE 3-16
HABITAT IMPACTS – ALTERNATIVE B

HABITAT TYPE	TOTAL ACRES WITHIN STUDY AREA B	PERMANENT IMPACTS[1] (MAXIMUM ACRES AFFECTED)
Cropland	4,712	2,890
California annual grassland	1,689	1,133
Vernal pool	0.1	0
Ephemeral wetland depression	0.6	0
Natural non-wetland pool	0.2	0.1
Anthropogenic non-wetland pool	0.1	~170 sq. ft. (0.004 acres)
Agricultural reservoir	1,742 sq. ft. (0.04 acres)	1,742 sq. ft. (0.04 acres)
Anthropogenic habitat	25	0

Source: Althouse and Meade 2010b
[1] All areas within Project fencing, roads outside of fences, monitoring and maintenance facility, substation, and switching station. Acreages listed are for a 4,100-acre Project; the area of permanent impact would be less under a reduced acreage development scenario.

Operation. Impacts on vegetation from operation of the Proposed Project under Alternative B would be similar to those described for Alternative A.

Decommissioning. Impacts on vegetation from decommissioning the Topaz Solar Farm would be similar to those described for Alternative A.

Reconductoring

Direct, temporary impacts on vegetation could occur from construction activities in staging areas, pull sites, and temporary access roads. Indirect effects include potential for weed introduction or spread, soil compaction, erosion, and sedimentation.

There would be no permanent impacts. PG&E would implement general biological resource protection measures and avoidance and mitigation measures from their San Joaquin Valley Operations and Maintenance Multi-Species Habitat Conservation Plan (HCP) to reduce temporary impacts. Examples of such

measures include worker environmental education, minimizing the extent of disturbance and vegetation clearing, weed prevention measures, revegetation of disturbed areas, and erosion control measures.

No Action Alternative

Under the no action alternative, no new impacts on vegetation would occur, as no project would be built. Current impacts on vegetation from land use practices, such as ranching and farming, would continue.

3.9 WILDLIFE

3.9.1 Affected Environment

This section addresses the affected environment and environmental consequences of the Project on wildlife within the Project Site. Individual special status wildlife species, including federal and state listed species, are addressed in Section 3.10, Special Status Species.

Regulatory Framework

Migratory Bird Treaty Act of 1918, as amended

The Migratory Bird Treaty Act (MBTA) (16 USC §§ 703-712) makes it unlawful to, among other things, pursue, hunt, take, capture, kill, or possess any migratory bird or part, nest, or egg of such bird listed in four separate wildlife protection treaties between the US and Great Britain (on behalf of itself and Canada), Mexico, Japan, and the former Union of Soviet Socialist Republics. The MBTA currently covers 1,007 species, as specified in 50 CFR Section 10.13.

Methods

Surveys for wildlife were completed concurrently with numerous special status species surveys, described in Section 3.10, Special Status Species. Scientists recorded all wildlife species observed within the Project Site. Documentation of wildlife included direct observation of animals, nests, tracks, and other signs of wildlife. In addition, surveyors used motion-detecting cameras installed at various locations within the Project Site to detect animal movements. Birds were identified by sight using binoculars or by bird calls and songs. Reptiles and amphibians were identified by sight using binoculars and by temporary captures. Mammals recorded at the site were identified by sight, tracks, motion-detecting cameras, and live traps. Carcasses, skulls, and bones were also examined (Althouse and Meade 2010b).

General Project Area

At least 144 animal species could potentially occur within the Project Site seasonally or as transients. These include numerous invertebrates, 3 amphibians, 17 reptiles, 83 birds, and 36 mammals. Due to the lack of perennial water sources within the Project Site, fish are unlikely to occur (Althouse and Meade 2010b). A description of wildlife with the potential to occur at the Project Site is provided below.

Invertebrates

Six species of aquatic arthropods were observed at the Project Site, including three species of fairy shrimp (*Branchinecta lindahli, B. longiantenna, and B. lynchi*). Two of these species are federally listed and are discussed in Section 3.10, Special Status Species. All three fairy shrimp species could potentially inhabit vernal pools, ephemeral wetland depressions, and natural non-wetland pools within the Project Site. The remaining three species of arthropods that were observed include water flea (Order *Cladocera*), water boatmen (Order *Corixidae*), and seed shrimp (Class *Ostracoda*). These species inhabit a number of aquatic habitat types within the Project Site (Althouse and Meade 2010b). A number of other invertebrates, such as spiders, bees, wasps, moths, and ticks could potentially occur on-site.

Amphibians

California toad (*Bufo boreas halophilus*), Pacific chorus frog (*Pseudacris regilla*), and Western spadefoot toad (*Spea hammondii*) were the three amphibian species observed at the Project Site. Western spadefoot toad is a California species of special concern and is discussed in Section 3.10, Special Status Species. The California toad and Pacific chorus frog live in upland habitats and breed in temporary impoundments. All three species utilize the agricultural reservoir in Section 28 for breeding habitat, and spadefoot toads also breed in the Section 20 reservoir (Althouse and Meade 2010b).

Reptiles

Of the 17 reptile species with the potential to occur at the Project Site, four common species were observed. These species are northern Pacific rattlesnake (*Crotalus oreganus oreganus*), Pacific gopher snake (*Pituophis catenifer catenifer*), long-nosed snake (*Rhinocheilus lecontei*), and side-blotched lizard (*Uta stansburiana*). Reptilian species present within the Project Site are those that prefer wide-open habitats and are adaptable to variable habitat conditions, including frequent disturbance. They are present in low abundance, potentially due to historical and current land use practices such as farming and intensive grazing (Althouse and Meade 2010b).

Birds

Birds are common in all areas of the Project Site; however, species diversity is generally low. Nearly all of the potentially occurring birds within the Project Site are protected by the MBTA. The exceptions include several nonnative species, such as the European starling (*Sturnus vulgaris*), rock dove (*Columba livia*), and Eurasian collared dove (*Streptopelia decaocto*). Habitats within the Project Site were found to support breeding activities for 21 bird species. The limited amount of vegetative cover within the Project Site reduces the suitability of the habitat for most bird species that require shrubs and trees for cover and nesting sites. However, some birds were observed using the landscaped trees in the anthropogenic areas for nesting, wintering, and foraging, and many bird species may utilize the open habitats on site for foraging. During winter bird surveys, 19

bird species were detected in grassland habitats, and 15 species were detected in croplands. Birds are most likely to occur as seasonal visitors or transients within the Project Site, since a large number of migrant bird species are known to move through the Carrizo Plain region seasonally. Only a few species such as common raven (*Corvus corax*) and horned lark (*Eremophila alpestris*) are true residents at the Project Site. Winter bird surveys identified foraging migrants such as ferruginous hawk (*Buteo regalis*) and long-billed curlew (*Numenius americanus*). Spring bird surveys identified nesting spring residents such as lark sparrow (*Chondestes grammacus*) and Western kingbird (*Tyrannus verticalis*) and spring migrants such as Western tanager (*Piranga ludoviciana*), MacGillivray's warbler (*Oporornis tolmiei*), black-throated gray warbler (*Dendroica nigrescens*), and Anna's hummingbird (*Calypte anna*), which utilize vegetated areas of the Project Site during migration (Althouse and Meade 2010b).

Mammals

Small mammal species. Seven small mammal species were captured at the Project Site during surveys. In general, small mammal diversity and abundance were low throughout the Project Site, likely due to habitat degradation from farming activities and elimination of vegetative cover and seed crops by intensive grazing. However, the deer mouse (*Peromyscus maniculatus gambelii*) is relatively common in active croplands since the species tolerates agricultural disturbance and there is abundant seed that the mouse can eat. Medium-sized mammals such as badger (*Taxidea taxus*), coyote (*Canis latrans*), and San Joaquin kit fox (*Vulpes macrotis mutica*) occur within the Project Site (Althouse and Meade 2010b). Special status mammal species within the Project Site are discussed in detail in Section 3.10, Special Status Species.

Bats. Potential bat roosting habitat is present for bats in occupied and abandoned structures on the Project Site. However, during visual inspections, no evidence of temporary or permanent use of abandoned structures was observed. Occupied residences were not surveyed. The Project Site could provide foraging habitat for some species of insectivorous bats, such as the big brown bat (*Eptesicus fuscus*) and Brazilian free-tailed bat (*Tadarida brasiliensis*).

Big game species. Large mammals such as tule elk (*Cervus elaphus nannodes*) and pronghorn antelope (*Antilocapra americana*) have been reintroduced to the Carrizo Plain and forage on field bindweed (*Convolvulus arvensis*) within the Project Site during the summer months. The cropland fields where they rest and feed are considered by the CDFG to be important summer habitat areas for these species (Althouse and Meade 2010b). Penrod et al. (2010) characterized the Project Site as mostly medium to high suitability for these species, with some highly suitable elk habitat. Portions of the northern and eastern sections of the Project Site are medium to high permeability for tule elk (Penrod et al. 2010). The local elk herd consists of approximately 80 individuals present in the late spring and summer. Elk are uncommon on the Project Site during winter months (Althouse and Meade 2010b).

Pronghorn antelope utilize grassland and cropland habitats throughout the Project Site, and Penrod et al. (2010) characterized the Project Site as mostly highly suitable and permeable pronghorn antelope habitat. Since pronghorn antelope avoid predators by visual detection and speed, they prefer open landscapes with good horizontal visibility, gentle slopes, and few movement obstacles (Penrod et al. 2010). They have been observed in all areas of the Project Site except Sections 15, 16, 21, and 22. Field observations in the biological reports suggest that the pronghorn antelope group that utilizes the Project Site is comprised of a maximum of 19 adult and sub-adult pronghorn antelope (Althouse and Meade 2010b), although recent observations indicate that there could be a greater number of individuals.

Big game movement. A wildlife movement corridor is an area of land that primarily functions to connect significant habitat areas (Althouse and Meade 2010b). Movement corridors are generally considered on a regional scale, whereby land managers designate and attempt to protect swaths of land potentially suitable for facilitating wildlife movements between core habitat areas. Designating and protecting wildlife movement corridors limits habitat fragmentation in landscapes where wildlife movements are constrained by surrounding land uses (Althouse and Meade 2010b).

Historically, herds of pronghorn antelope and tule elk roamed throughout the region. These animals may have moved into and out of the Carrizo Plain to access seasonal foraging areas (Althouse and Meade 2010b). Potential wildlife linkages to the San Joaquin Valley from north of Carrizo Plain, such as Antelope Valley and Bitterwater Valley, are still largely viable. Such movements are not undertaken by the reintroduced herds of tule elk and pronghorn antelope that are present in the Carrizo Plain region. However, elk and antelope may move north out of the Carrizo Plain, along the San Andreas Rift Zone in the Temblor Range as far north as Cholame Valley (Althouse and Meade 2010b).

The northern California Valley tule elk herd roams foothills of the Temblor Range east of the Project Site. Tule elk do not move through the Project Site to access core habitat areas. The northern California Valley pronghorn antelope group regularly moves through the Project Site while foraging, and pronghorn antelope movements are determined by fence location. Pronghorn antelope prefer to crawl underneath fences rather than jump over them (Penrod et al. 2010). Within the Project Site, pronghorn antelope make regular movements through permanent fence openings and take advantage of gates that are left open. The types of fences in the Carrizo Plain vary, but fence breaks are frequent enough to prevent a complete barrier to pronghorn antelope movement (Penrod et al. 2010). In general, however, the fences limit pronghorn antelope movement through the Project Site (Althouse and Meade 2010b).

Study Area A

Wildlife within Study Area A are the same as described under the general project area. However, while suitable habitat exists within Study Area A, elk were not detected in this area.

Study Area B

Wildlife within Study Area B are the same as described under the general project area. Within Study Area B, elk have been detected in Sections 7, 8, 17, and 18.

Reconductoring

Wildlife near the PG&E transmission line include bird species, tule elk, and pronghorn antelope. Many of the wildlife species (non-special status species) would be the same as those found within the Project Site. Since the reconductoring route would span a greater number of vegetation communities (see Section 3.8, Vegetation), an increased number of habitat types would be present. These would support additional common wildlife species, such as those that use salt desert scrub, oak woodland, and California juniper woodlands. Shrub and tree-nesting bird species may be more common along the route, due to the presence of shrub and woodland vegetation communities. Suitable habitat for tule elk occurs throughout the Temblor Range and California Valley, whereas pronghorn occur in California Valley and along the western portion of the reconductoring route. Calving grounds for tule elk and pronghorn may be located near the reconductoring route.

3.9.2 Environmental Impacts

Substantial impacts on wildlife would occur if the Proposed Action were to result in one or more of the following:

- Adversely affect a population by substantially reducing its numbers, causing a fish or wildlife population to drop below self-sustaining levels, or causing a substantial loss or disturbance to habitat. Such effects could include vehicle impacts and crushing, increased predation, habitat fragmentation, or loss of seasonal habitat;
- Have a substantial adverse impact, such as take, on nesting migratory birds as protected under the MBTA, including raptors; or
- Interfere with the movement of any resident or migratory fish or wildlife species, with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Construction activities, heavy equipment, and vehicle use on site during construction potentially could cause mortality or injury to a variety of wildlife species, especially slower-moving species, small animals, species that have subsurface burrows, or ground- or shrub-nesting birds. Construction activities would be most likely to affect animals that are active during the daytime, when construction would occur.

Construction could also cause short-term visual and noise disturbance associated with construction activities, human presence, vehicles on site, and night lighting (night lighting requirements are discussed in Chapter 2). Direct effects would occur within the project area, but indirect effects could also occur in areas immediately adjacent to the project area. Nesting birds, bats, and reptiles are particularly sensitive to human presence and noise. Visual and noise disturbances could cause wildlife to alter their foraging, migration, wintering, and breeding behaviors and avoid suitable habitat within or near the project area. In the most extreme case, disturbances could cause animals to abandon their nests, roosts, or territories. Displacement of individuals could increase competition for resources in adjacent habitats, which may or may not be able to support more wildlife. Any change in wildlife behavior associated with visual or noise disturbance could have an energetic cost, making animals more susceptible to disease, predation, or unsuccessful reproductive or hunting efforts. If foraging adults are unsuccessful, it could cause lowered survival of dependent young, such as chicks.

Construction noise could also cause physiological effects, such as increased heart rate, altered metabolism, and a change in hormone balance (Radle 2007). Determining the effect of noise is complicated because different species and individuals have varying responses to sound (Radle 2007), but it is assumed that at least some species would be impacted. Many animals displaced during construction would be able to return to the area once construction is complete.

Project construction and ground vibration could cause the loss of burrows due to either physical destruction of burrows or from avoidance behavior. This would cause wildlife to search for or dig new burrows, which would expend more energy. Impacts from energetic costs would be similar to those described for noise and visual impacts.

The following measures have been incorporated into the Proposed Action to reduce impacts on wildlife during construction (see Table 2-9). Measures described in Section 3.8, Vegetation, such as biological monitoring would also protect wildlife species during construction.

- Minimize construction within estimated 100-year flood boundary to create wildlife movement corridors throughout the Project Site. Proposed corridors are over one mile wide in places. Minimum corridor width is approximately 500 feet. Pronghorn antelope and elk could move north and south through the corridors.
- Prepare and implement an Avian Protection Plan prior to construction. The plan would delineate monitoring efforts for death and injury of birds and bats caused by collisions with facility features such as collector lines and PV arrays. Details of this measure would be developed through coordination with the USFWS and CDFG.
- If work occurs between March 15 and August 15, nesting bird surveys shall be conducted within one week prior to ground disturbance activities. If surveys do not locate nesting birds, construction activities would proceed. If nesting birds are located, no construction activities would occur within 100 feet of nests until chicks are fledged. A pre-construction survey report would be submitted to the lead agency immediately upon completion of the survey. The report would detail appropriate fencing or flagging of the buffer zone and make recommendations on additional monitoring requirements. A map of the Project Site and nest locations would be included with the report. The Project biologist conducting the nesting survey would have the authority to reduce or increase the recommended buffer depending upon site conditions.

Operation. Mortality or injury from collision with vehicles could potentially occur during operation and maintenance, but this is less likely than during construction, as fewer vehicles would be accessing the site during operation and maintenance.

Bird mortality and/or injury could occur during operation of the Proposed Project due to collision or electrocution with the 8 to 12 miles of collector lines that would transport electricity to the substation. Birds could also collide with the two transmission towers and steel poles that would be installed within or adjacent to PG&E's transmission line right-of-way. Bird collisions may occur when a transmission line or structure transects a daily flight path used by a concentration of birds or when migrants are traveling at reduced altitudes and encounter tall structures in their path. These collisions generally occur during inclement weather or low light levels, and are more common with waterfowl, shorebirds, and other large species with low maneuverability (APLIC 2006, Faanes 1987).

Very little research has been conducted to date, but operation of the PV arrays could cause an increase in Polarized Light Pollution (PLP). According to Horvath et al. (2009), some species are sensitive to polarized light, and PLP caused by

anthropogenic structures could alter the ability of wildlife to seek out suitable habitat and detect the presence of and elude predators. For a variety of birds and other species, PLP could affect their ability to detect natural polarized light patterns in the sky, which could compromise their navigation ability and impact dispersal and reproduction (Horvath et al. 2009).

Electrocution occurs when a perching bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This can occur when horizontal separation is less than the wrist-to-wrist (flesh-to-flesh) distance of a bird's wingspan or when vertical separation is less than a bird's length from head to foot. Electrocution happens most frequently on distribution lines between 1- and 60-kV (APLIC 2006); collector lines for the Project would carry 34.5 kV of electricity. Raptors are usually more at risk of this type of electrocution because of their size, distribution, and behavior. Guidelines have been developed and would be implemented to reduce avian electrocution risk (APLIC 2006). The substation may pose electrocution hazards for some birds, since the wires, bus work, and support structures can provide potential roosting, perching, and nesting sites. Birds may be electrocuted when making conductor-to-conductor or conductor-to-ground contact with uninsulated equipment. High-voltage components of the substation would provide sufficient conductor clearance to minimize bird electrocutions.

Lighting and noise from operation of the substation and switching station could affect wildlife behavior and physiology, and could cause wildlife to avoid the substation and switching station over the long term and up to a short distance from those areas. If species avoid portions of the Project Site and adjacent habitats, actual long-term habitat loss would be greater than the direct loss of habitat caused by the Project footprint. The magnitude of impacts would depend on each species' sensitivities to disturbance and adaptability to Project features such as PV arrays, access roads, noise, and human presence. Over time, species may adapt to the noise and recolonize the site. Lighting may attract some species, which would make wildlife more visible to predators and could disrupt resting, foraging, and mating activities. Night lighting would be utilized at the monitoring and maintenance facility, substation, and switching station, and interior lights would be used on an as-needed basis within the inverter exclosures. No exterior lighting would be located around the Project perimeter or within the PV arrays. All lights would be shielded downward to reduce impacts on the surrounding lands.

Project features such as the PV arrays, access roads, substation, and associated fencing could also displace populations and affect the movement of wildlife through the area, particularly mammals such as tule elk, pronghorn antelope, and kit fox. The PV arrays would alter the vertical structure of the landscape, reducing site openness and potentially concealing predators, which could make the site less desirable for some species and could cause increased mortality. Impacts on kit fox are described in Section 3.10, Special Status Species.

Displacement area is calculated as the proposed acreage of the Project Site that would have perimeter exclusion fencing within each identified species' range. Alternative A would not displace elk from their current foraging habitat within the Project Site. Pronghorn antelope forage in most areas of Study Area A. The Alternative A development area would permanently displace the local pronghorn antelope group from up to 4,100 acres within the Project Site.

The Proposed Project would reduce the amount of open land available to some wildlife species for long-range movements into and out of the northern Carrizo Plain. The proposed fenced area of the Project could affect up to 4,100 acres of mostly flat bottomlands, the preferred movement area for pronghorn antelope. Pronghorn antelope and elk would still be able to access areas in all directions, although movement opportunities would be reduced. The County may require measures to facilitate the removal or modification of fences within the Carrizo Plain region so as to benefit tule elk and pronghorn movement and to establish a "California Valley Land Acquisition Program," for acquisition of private lands within the California Valley subdivision to maximize use by sensitive wildlife. Details regarding these measures would be included in the EIR. If implemented, these measures would reduce the level of impact related to loss of open lands.

The Project Site does not support any known bird or bat migratory corridors, so no effect on migratory movement for occurring or potentially occurring species is anticipated.

Habitat loss, fragmentation, and degradation (e.g., weed invasion, changes to the hydrologic regime) caused by the Project (e.g., PV arrays, fencing, distribution lines) could displace wildlife from the Project Site over the long term, preventing them from using the site for foraging, breeding, wintering, and shelter. Habitat fragmentation could separate wildlife into smaller populations, making them more vulnerable to predation, drought, or disease. Some species prefer undisturbed habitat and may avoid the Project Site when developed. This could cause them to use less suitable habitat, with associated energetic costs as described previously for construction. Other species may adapt to the development and recolonize the site over the long term.

Increased abundance of introduced weeds is generally correlated with reduced habitat quality for native wildlife. A vegetation management plan would be implemented and would include measures to reduce the likelihood for introduction and spread of weeds. Most habitat disturbance would occur in croplands, which provides poor quality wildlife habitat.

PV arrays could cause altered light or hydrologic regimes, causing shading, increased soil moisture, or a change in temperature below the modules. This could change the habitat suitability for species that rely on open, sunny, and dry areas. The arrays could also conceal predators, increasing mortality for some species.

The existing cropland habitats within the Project Site presently act as an undesirable "biological sink" for many small- to medium-sized animals, which move into croplands from adjacent habitats and are killed by farming activities such as plowing. As the Proposed Project would remove all croplands within the Project Site from production, and convert many of them to annual grassland habitat, these adverse impacts would no longer occur.

The following measures have been incorporated into the Proposed Action to reduce impacts on wildlife during operation (see Table 2-9). Measures previously described in Section 3.8, Vegetation, would also benefit wildlife species on the Project Site.

- In addition to fencing removal within PV array areas, existing cross-fencing and wildlife wire fencing would be removed from 100-year flood boundary movement corridors within the Project Site to promote wildlife passage through the area. Other fencing on land outside the fenced development areas to be owned by the Project Proponent, especially at existing crossing sites along Highway 58 and fences within corridors adjacent to Project facilities, would be eliminated or made antelope-friendly to facilitate passage to the extent feasible.
- If determined necessary, mitigation for loss of tule elk and pronghorn antelope habitat would be accomplished through protection of land designated as mitigation for kit fox (see Section 3.10, Special Status Species). Topaz Solar Farm mitigation lands for kit fox would provide beneficial habitat for both elk and pronghorn antelope without reducing quality of habitat for kit fox. If adopted, this approach could protect acreages of lands substantially greater than habitat used by pronghorn antelope and elk within the proposed Topaz Solar Farm area.
- Avian Power Line Interaction Committee guidelines (APLIC 2006) and avian protection measures would be implemented to reduce the likelihood of bird collision and electrocution with collector lines. These measures include:
    - Increasing separations of cables to achieve adequate distance for the species involved;
    - Covering energized parts and grounded parts with materials appropriate for providing incidental contact protection to birds;
    - Applying perch management techniques; and/or
    - Installing avian flight diverters on power lines.

Decommissioning. Impacts from decommissioning would be similar to those from construction of the Project, as ground disturbance would occur and vehicles and personnel on-site would increase for a period of time.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Impacts from construction of the Topaz Solar Farm would be similar to those described under Alternative A.

Operation. Impacts from operation of the Topaz Solar Farm would be similar to those described under Alternative A. In addition, elk forage and calve in the northern parcels within Study Area B (Sections 7, 8, 17, and 18), an area of approximately 1,795 acres mostly comprised of active croplands. Alternative B would permanently displace approximately 80 elk from 1,215 acres of foraging habitat within the proposed fenced portion of Alternative B. Alternative B would permanently displace pronghorn antelope from up to 4,000 acres within the Project Site.

Decommissioning. Impacts from decommissioning the Topaz Solar Farm would be similar to those described previously for Alternative A.

Reconductoring

Impacts on wildlife resulting from the PG&E Reconductoring Project are expected to be temporary and would be related to construction noise, human presence, driving vehicles off-road, hand removal of vegetation, and use of helicopters. Since reconductoring would occur over 35 miles, there is the potential to affect species over a larger geographic area compared to the Proposed Project. Reconductoring of the transmission line would result in temporary loss of grassland habitat and loss of foraging habitat for wildlife, and could result in disturbance to wildlife. The Project would potentially impact bird nests and create disturbance to tule elk and pronghorn antelope calving grounds. Construction could also result in the spread of noxious weeds.

PG&E would implement general biological resource measures and avoidance and mitigation measures from their San Joaquin Valley Operations and Maintenance Multi-Species Habitat Conservation Plan (HCP) to reduce temporary impacts. Examples of such measures include worker environmental education, minimizing the extent of disturbance and vegetation clearing, pre-construction nesting bird surveys, and consultation with CDFG biologists to ensure protection of elk and pronghorn calving sites.

No Action Alternative

Under the no action alternative, no new impacts on wildlife would occur, as the Proposed Project would not be constructed. Existing adverse impacts from land use practices, such as ranching and farming, would continue to occur.

3.10 SPECIAL STATUS SPECIES

3.10.1 Affected Environment

This section addresses special status species, which are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy, or are considered sufficiently rare or threatened to qualify for such protection. Descriptions of the different types of special status species are presented below under *Types of Special Status Species*.

Much of the detail and analysis presented in Section 3.8, Vegetation and Section 3.9, Wildlife are applicable to special status species. This is because special status species rely on the vegetation for habitat and/or associate with other wildlife species through such interactions as predator-prey, mutualistic, or commensal relationships.

Regulatory Framework

Endangered Species Act of 1973

The Endangered Species Act (ESA) of 1973 (16 USC §§1531 *et seq.*), as amended, provides for the conservation of federally listed plant and animal species and their habitats. The ESA directs federal agencies to conserve listed species and imposes an affirmative duty on these agencies to ensure that their actions are not likely to jeopardize the continued existence of a listed species or adversely modify its designated critical habitat.

Critical habitat is defined in the ESA as "the specific areas within the geographical area occupied by the species, …, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and… specific areas outside the geographical area occupied by the species… upon a determination by the Secretary [of the Interior] that such areas are essential for the conservation of the species" [16 USC 1532(5)(A)].

Under the ESA, Section 7 formal consultation is required when a federal action may affect, and is likely to adversely affect, a listed species or designated critical habitat. During this process, the federal action agency submits a biological assessment to the USFWS and/or the National Marine Fisheries Service, which includes a list of potentially and/or actually occurring listed species and designated critical habitat that may be affected by the project, a description of the proposed project, and an evaluation of the potential effects of the project on such species and habitat. During formal consultation, the USFWS and the federal action agency exchange information and gather any necessary additional information. Section 7 formal consultation concludes with the USFWS issuing a biological opinion, detailing their conclusion of jeopardy or no jeopardy to a species and adverse modification/no adverse modification to a critical habitat. All reasonable and prudent measures and any incidental take statement are

contained in the biological opinion. Section 7 consultation for the Proposed Project began on February 18, 2011, with submission of a biological assessment to USFWS.

Bald and Golden Eagle Protection Act
The Bald and Golden Eagle Protection Act (16 USC 668-668d) applies primarily to taking, hunting, and trading activities that involve Bald or Golden Eagles. The Act prohibits the "taking" of any individuals of these two species, as well as any part, nest, or egg. The term "take" as used in the act includes "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb."

California Endangered Species Act (CDFG Code Sections 2062 and 2067)
The California Endangered Species Act (CESA) is the California equivalent of the federal ESA, although it has different provisions, different lists of species, and is administered by the CDFG. CESA was enacted to protect sensitive resources and their habitats. The CESA prohibits the take of CESA-listed species unless specifically provided for under another state law. CESA does allow for incidental take associated with otherwise lawful development projects. The CDFG recommends consultation early in project planning stages to avoid potential impacts on rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project-induced losses of listed species. A project applicant is responsible for consulting with the CDFG, if applicable, to preclude activities that are likely to jeopardize the continued existence of any CESA-listed threatened or endangered species or destroy or adversely affect habitat essential for any given species.

Fully Protected Species (CDFG Code §3511, §4700, §5515, and §5050)
These sections prohibit the taking and possession of birds, mammals, fish, and reptiles listed as fully protected. The administering agency is the CDFG.

Types of Special Status Species

Federally Listed Species
Species listed as endangered under the ESA are those species that are "in danger of extinction throughout all or a significant portion of its range" (16 USC §§1532(6)). A species listed as threatened under the ESA is considered "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 USC §§1532(20)). A candidate species is any species "for which the Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities" (USFWS 2001). Candidate species receive no statutory protection under the ESA. Proposed species for ESA listing are those candidate species that were found to warrant listing as either threatened or endangered and were officially proposed as such in a

Federal Register notice after the completion of a status review and consideration of other protective conservation measures.

State-Listed Species
The definition of California endangered and threatened species is similar to the federal definition. These species are protected under the CESA.

The classification of Fully Protected Species was the state's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. These species "....may not be taken or possessed at any time and no provision of this code or any other law would be construed to authorize the issuance of permits or licenses to take any fully protected" species, although take may be authorized for necessary scientific research. Many, but not all, fully protected species have since been listed as threatened or endangered under the CESA.

Certain vertebrate species have been designated as Species of Special Concern (SSC) because declining population levels, limited ranges, or continuing threats have made them vulnerable to extinction. The goal of designating SSC is to halt or reverse their decline by calling attention to their plight and addressing the issues of concern early enough to secure their long-term viability.

"Special Animals" is a general term that refers to all of the animal taxa inventoried by the California Natural Diversity Database (CNDDB), regardless of their legal or protection status (CDFG 2009). The Special Animals list is also referred to by the CDFG as the list of "species at risk" or "special status species." These taxa may be listed or proposed for listing under the California and/or federal ESAs, but they may also be unprotected species deemed biologically rare, restricted in range, declining in abundance, or otherwise vulnerable.

CNPS-Listed Species
The California Native Plant Society (CNPS) maintains several lists of special status plant species within California. These lists include:

- List 1A: Presumed extinct in California
- List 1B: Rare or Endangered in California and elsewhere
- List 2: Rare or Endangered in California, more common elsewhere
- List 3: Plants for which more information is needed – Review list
- List 4: Plants of limited distribution – Watch list

Some lists have numerical extensions describing the threats to the species in California. These threat code extensions and their meanings are as follows:

- .1 – Seriously endangered in California
- .2 – Fairly endangered in California
- .3 – Not very endangered in California

All of the categories of species described above will be considered "special status species" for the purposes of this section.

Methods

Field surveys for special status plants and wildlife were conducted at the Project Site. Prior to surveys, a list of potentially occurring special status species was compiled using the CNDDB (CDFG 2010) and the CNPS Online Inventory of Rare and Endangered Plants of California (CNPS 2010) for the twelve USGS quadrangles that include and surround the Project Site: La Panza NE, California Valley, La Panza, La Panza Ranch, Holland Canyon, Packwood Creek, Shale Point, Las Yeguas Ranch, Simmler, Chimineas Ranch, Branch Mountain, and Los Machos Hills. Additional special status species research consisted of reviewing previous biological reports for the area and searching online museum and herbarium specimen records for San Luis Obispo County. A species list was requested from the USFWS, which deferred to the BLM species list for the Carrizo Plain National Monument (Althouse and Meade 2010b).

After compiling these lists, it was determined that 33 special status plants and 44 special status animals were reported in the region and would be considered during field surveys (Althouse and Meade 2010b). A floristic study and numerous specialized wildlife surveys were conducted from 2007 through 2010.

Special Status Plant Surveys

Special status plant surveys were conducted within portions of the Project Site starting in 2007. The entire Project Site was surveyed for special status plants in 2010. Surveys were conducted mainly on foot, utilizing transect and focused survey methods. An all-terrain vehicle was utilized to survey bare croplands (Althouse and Meade 2010b). Additional details regarding survey methods are presented in Appendix E.

Identification of botanical resources included field observations and laboratory analysis of collected material. Voucher specimens were collected for all special status species. Botanical surveys were timed to coincide with the typical blooming period for special status plant species with potential to occur in the Project Site. Nine botanical reference sites were visited where special status species were in full bloom in order to verify appropriate survey timing and to ensure familiarity with potential special status species. Repeat visits were necessary to find certain species in flower (Althouse and Meade 2010b).

Special Status Wildlife Surveys

Comprehensive special status wildlife surveys have been conducted for the entire Project Site beginning in 2007. The special status wildlife surveys that have been completed are listed below by species:

- Blunt-nosed Leopard Lizard:
  - 2007 Partial Protocol Blunt-nosed Leopard Lizard Survey; Sections 28 and north half 33;
  - 2008 Protocol Blunt-nosed Leopard Lizard Survey; Sections 28 and 33;
  - 2008 Protocol Blunt-nosed Leopard Lizard Survey; Sections 1 and 6 (not part of current Project Site), 8, 15, 16, 21, 22, 29;
  - 2009 Protocol Blunt-nosed Leopard Lizard Survey; Sections 19, 21, 22 and 27;
  - 2010 Protocol Blunt-nosed Leopard Lizard Survey, Adult Period; all or portions of Sections 4, 5, 26, 32, 34 and 35; and
  - 2010 Protocol Blunt-nosed Leopard Lizard Survey, Juvenile Period; Sections 4, 5, 26, 32, 34 and 35.
- Small Mammal Trapping:
  - 2008 Small Mammal Trapping Survey, Sections 28 and north half 33;
  - 2008 Small Mammal Trapping Survey, Sections 1, 6, 8, 15, 16, and 23;
  - 2009 Small Mammal Trapping Survey, Sections 19, 21, 22, and 27; and
  - 2010 Small Mammal Trapping Survey, Sections 4, 5, 15, 26, 28, and 32-35.
- Giant Kangaroo Rat:
  - 2010 Giant Kangaroo Rat Burrow and Scat Measurement Study
- Fairy Shrimp:
  - 2008 Dry Season Protocol Fairy Shrimp Survey;
  - 2009 Wet Season Protocol Fairy Shrimp Survey;
  - 2009 Dry Season Protocol Fairy Shrimp Survey;
  - 2010 Wet Season Protocol Fairy Shrimp Survey; and

  - 2010 Dry Season Protocol Fairy Shrimp Survey.

- San Joaquin Kit Fox:
  - 2008 Remote Camera and Kit Fox Sign Study
  - 2009 Scat Detection Dog Surveys for San Joaquin Kit Fox;
  - 2010 San Joaquin Kit Fox Genetic Study; and
  - 2010 San Joaquin Kit Fox Natal Den Location Survey.

- Golden Eagle:
  - 2010 Aerial Protocol Survey for Golden Eagles

- Kern Primrose Sphinx Moth:
  - 2010 Habitat Assessment and Limited Presence-Absence Survey

- Pronghorn Antelope and Tule Elk:
  - 2010 Movement and Fence Crossing Survey

Documentation of special status wildlife within the Project Site utilized general observation data in combination with highly specialized sampling techniques for detecting and determining the identification of difficult to locate or rare taxa. Special status wildlife surveys were conducted according to rigors of published survey protocols and standard survey methodologies (Althouse and Meade 2010b).

Special status wildlife documentation included direct observations of animal presence, nests, tracks, and other wildlife sign. Motion-detecting cameras were also installed at various locations within the Project Site to detect animal movements. Observations of special status wildlife were recorded during field surveys in all areas of the Project Site. Methods are described in Section 3.9, Wildlife.

Many of the specialized wildlife surveys conducted within the Project Site were published as independent reports. All supporting biological reports provide detailed survey methodologies for each special status species that was surveyed.

General Project Area

Special Status Plants

Twenty special status plant species could potentially occur within the Project Site based on availability of suitable habitat and soil conditions. These species are listed in **Table 3-17**, Special Status Plant Species with the Potential to Occur in the Project Site. Of these, nine special status plant species were

TABLE 3-17
SPECIAL STATUS PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROJECT SITE

SPECIES	STATUS	HABITAT PREFERENCE	POTENTIAL HABITAT IN THE PROJECT SITE?	DETECTED WITHIN PROJECT SITE?
Oval-leaved Snapdragon *Antirrhinum ovatum*	Global/State: G3/S3.2 CNPS: 4.2	Heavy, adobe-clay soils on gentle, open slopes, also disturbed areas; 200 to 1,000 meters.	Yes. Suitable clay soils are present.	Yes – Study Area A
Indian Valley Spineflower *Aristocapsa insignis*	Global/State: G2/S2.2 CNPS:1B.2	Cismontane woodland; 300 to 600 meters.	Yes. Potentially suitable sandy soils are present in the south end of Section 4.	No
Salinas Milk-vetch *Astragalus macrodon*	Global/State: G3/S3.3 CNPS: 4.3	Eroded pale shales or sandstone, or serpentine alluvium; 300 to 950 meters.	Yes. Suitable habitat is present.	Yes – Study Areas A and B
Round-leaved Filaree *California macrophylla*	Global/State: G3/S3.1 CNPS: 1B.1	Clay soils in cismontane woodland, valley and foothill grassland; 15 to 1,200 meters.	Yes. Suitable clay soils are present in Sections 4, 5, 32, and 33.	Yes – Study Area A
Hall's tarplant *Deinandra halliana*	Global/State: G1/S1.1 CNPS:1B.1	Chenopod scrub, Cismontane woodlands, valley and foothill grasslands on variety of soil types including alkaline; 300 to 950 meters.	Yes. Suitable habitat is present.	No
Gypsum-loving Larkspur *Delphinium gypsophilum* ssp. *gypsophilum*	Global/State: G4T3/S3.2 CNPS: 4.2	Chenopod scrub, cismontane woodland, grassland	Yes. Potentially suitable habitat is present in untilled annual grasslands.	No
Recurved Larkspur *Delphinium recurvatum*	Global/State: G2/S2.2 CNPS: 1B.2	Poorly drained alkaline soils in chenopod scrub, grassland, cismontane woodland; 3 to 685 meters.	Yes. Potentially suitable habitat is present in untilled annual grasslands.	No
Temblor Buckwheat *Eriogonum temblorense*	Global/State: G3/S3.2 CNPS: 1B.2	Barren clay in grassland, sandstone outcrops; 300 to 1,000 meters.	Yes. Marginally suitable habitat may be present in Sections 15 and 16.	No
Spiny-sepaled Button Celery *Eryngium spinosepalum*	Global/State: G2/S2.2 CNPS: 1B.2	Vernal pools in valley and foothill grasslands, sometimes in granitic clays; 100-420 meters.	Yes. Suitable vernal pool habitat is present.	Yes – Study Area A.
Diamond-petaled California Poppy *Eschscholzia rhombipetala*	Global/State: G1/S1.1 CNPS: 1B.1	Alkaline clay flats and slopes in grasslands, fallow fields; 0 to 975 meters.	Yes. Suitable habitat is present in Section 5, and possibly elsewhere.	No (occurs outside boundary of Study Area A)
Santa Lucia Dwarf Rush *Juncus luciensis*	Global/State: G3/S3 CNPS: 1B.2	Obligate wetland plant. Vernal pools, ephemeral drainages, wet meadow habitats, and streams; 300 to 2,040 meters.	Yes. Suitable ephemeral aquatic habitat is present.	Yes – Study Area A

TABLE 3-17 *(continued)*
SPECIAL STATUS PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROJECT SITE

SPECIES	STATUS	HABITAT PREFERENCE	POTENTIAL HABITAT IN THE PROJECT SITE?	DETECTED WITHIN PROJECT SITE?
Ferris' Goldfields *Lasthenia ferrisiae*	Global/State: G3/S3.2 CNPS:4.2	Vernal pools or wet saline flats in alkaline clay soil; < 700 meters.	Yes. This species could occur in vernal pools and other mesic areas.	Yes – Study Areas A and B
Coulter's Goldfields *Lasthenia glabrata* ssp. *coulteri*	Global/State: G4T3/S2.1 CNPS: 1B.1	Saline places, vernal pools; occurs near Soda Lake in Carrizo Plain; <1000 meters.	Yes. Suitable habitat may be present in the ephemeral aquatic habitats.	No
Pale Yellow Layia *Layia heterotricha*	Global/State: G1/S1.1 CNPS: 1B.1	Alkaline or clay soils, open areas, in pinyon-juniper woodland, grassland; 270 to 1,705 meters.	Yes. Potentially suitable habitat is present in grasslands with clay soils.	No
Munz's Tidy tips *Layia munzii*	Global/State: G1/S1.1 CNPS: 1B.2	Alkaline clay soils in chenopod scrub, grasslands; 45 to 760 meters.	Yes. Suitable habitat is present.	Yes – Study Areas A and B
Jared's Peppergrass *Lepidium jaredii* ssp. *jaredii*	Global/State: G1T1/S1.2 CNPS: 1B.2	Alkali bottoms, slopes, washes, <500 meters.	Yes. Potentially suitable habitat and soil conditions may be present in Section 4.	No
Showy Madia *Madia radiata*	Global/State: G2/S2.1 CNPS: 1B.1	Grassy slopes, often in heavy clay; <900 meters.	Yes. Suitable habitat is present.	No
San Joaquin Woolly Threads *Monolopia congdonii*	Federal: E Global/State: G3/S3.2 CNPS: 1B.2	Chenopod scrub, grassland, in alkaline or loamy plains or sandy soils. 60 to 800 meters.	Yes. Suitable habitat is present in sandy and loamy areas of Sections 4 and 5 in short grasslands.	No
Shining Navarretia *Navarretia nigelliformis* ssp. *radians*	Global/State: G4T2T3/S2S3.2 CNPS: 1B.2	Vernal pools, valley and foothill grassland, and woodland habitats, 76-1,000 meters.	Yes. Suitable habitat is present.	Yes – Study Area A
Paso Robles Navarretia *Navarretia jaredii*	Global/State: G3S3.3 CNPS:4.3	Open, grassy areas, often in clay or serpentine. 200 to 500 meters.	Yes. Suitable habitat is present in untilled grasslands.	Yes – Study Areas A and B

Status:
Federal: Endangered (E) or Threatened (T) listing under the federal Endangered Species Act
Global/State: NatureServe ranking system. Utilizes a numbered hierarchy from one to five following the Global (G-rank) or State (S-rank) category where 1=Critically Imperiled and 5=Secure. In cases where an uncertainty exists in the designation, a question mark (?) is placed after the rank. Full details available at natureserve.org.
CNPS: California Native Plant Society list. The listing categories range from species with a low threat (List 4) to species that are presumed extinct (List 1A). The List 1B species are rare throughout their range. All of them are judged to be vulnerable under present circumstances, or to have a high potential for becoming vulnerable.

identified within the Project Site, and one additional species was found just outside the Project Site boundary. Not all of these nine special status plant species are located within Project fences in currently proposed configurations. No plant species listed under the federal ESA were found, although one federally listed plant, San Joaquin woollythreads (*Monolopia congdonii*), does have suitable habitat within the Project Site. A detailed account of each potentially occurring species is presented below. Habitat for most special status plants has been affected by current land use practices such as agriculture and ranching.

Oval-leaved Snapdragon (*Antirrhinum ovatum*) is a CNPS List 4.2 species with a limited distribution from Fresno County south to Ventura County. It is a species of conservation interest due to its infrequent blooming periods. Oval-leaved snapdragon occurs in a variety of habitats, including woodlands, grasslands, and vernal pools, where it blooms from May to November. Environmental conditions, such as fire and/or alternating wet and dry years that suppress the growth of competing grasses, are likely to play a role in the species' seed germination. As a result, the species can be abundant in some years, and entirely absent in other years. Oval-leaved snapdragon has bloomed rarely in San Luis Obispo County in the last 20 years (Althouse and Meade 2010b).

Suitable grassland habitat with clay soils or clay loam soils high in gypsum occur in the Project Site in the east end of Section 5. The closest reported occurrence is a 1952 collection from Bitterwater Road approximately 5.4 miles north of the Project Site. Four additional collections range from 6.6 miles east-southeast of the Project Site to 10.4 miles northeast of the Project Site in the Temblor Range (Althouse and Meade 2010b).

Oval-leaved snapdragon occurs in one location within the Project Site. Approximately 35 plants were found scattered in cropland habitat in Study Area A, at the east end of Section 5.

Indian Valley Spineflower (*Aristocapsa insignis*) is a CNPS List 1B.2 species that is endemic to Monterey and San Luis Obispo Counties. Indian Valley spineflower typically blooms between May and September. The CNDDB contains records of four documented localities for this species; two in Monterey County and two in San Luis Obispo County. Potentially suitable sandy soils occur within the Project Site for Indian Valley spineflower in the southern part of Section 4. The closest occurrence is approximately 1.4 miles west of the Project Site, along San Juan Creek near Highway 58, with the second report for the county on Black Mountain, approximately fourteen miles west of the Project Site (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined Indian valley spineflower does not occur within the Project Site (Althouse and Meade 2010b).

Salinas Milk-vetch (*Astragalus macrodon*) is a CNPS List 4.3 perennial species that ranges from San Benito County south to San Luis Obispo County and east to Kern County. It is uncommon in most areas but occurs regularly in appropriate soil conditions. It usually occurs on sandstone, pale shales, or serpentinite soils in grassland, chaparral, and woodland habitats (Althouse and Meade 2010b). Suitable habitat is found in the vicinity of the Project Site and individuals occur in scattered patches in Study Area A and B, Sections 4, 5, 15, 16, and 33.

Round-leaved Filaree (*California macrophylla*) is a CNPS List 1B.1 annual species known from sporadic occurrences throughout the interior region of California. Round-leaved erodium occurs in clay soils in woodland and grassland habitats. The closest reported occurrence of this species is an old collection from Pinole Hills approximately 3.5 miles north-northeast of the Project Site. Surveyors confirmed the bloom period for this species on March 26 and April 6, 2010 at a reference site located approximately 10 miles southeast of the Project Site. Surveyors also observed this species in 2010 at a reference site for other rare plants at the corner of Belmont Trail and Clarksburg Road in California Valley, approximately 4.6 miles southeast of the Project Site. It was observed in Study Area A (Althouse and Meade 2010b).

Hall's Tarplant (*Deinandra halliana*) is a CNPS List 1B.1 species that occurs in Fresno, San Benito, Monterey, and San Luis Obispo Counties, where it blooms in April and May. It reaches its southern distribution limit in eastern San Luis Obispo County north of the Carrizo Plain on the east side of Bitterwater Road just north of Pinole Spring. It is reported most commonly in clay soils in annual grassland habitat, but may also occur in sandy washes and in woodland vegetation communities. The Project Site is approximately five miles south of the southernmost occurrence of Hall's tarplant. Moderately appropriate habitat and soils are present for Hall's tarplant within the Project Site. The CNPS Online Inventory (CNPS 2010) reports that this species appears only in unusually wet years; 2010 was an above average year for precipitation in the Project Site; thus, this species should have been detectable had it occurred (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined Hall's tarplant does not occur within the Project Site (Althouse and Meade 2010b).

Gypsum-loving Larkspur (*Delphinium gypsophilum* ssp. *gypsophilum*) is a CNPS List 4.2 subspecies known from scattered localities in eastern San Luis Obispo County, western Kern County, and elsewhere in interior southern California, where it blooms from February through May. Althouse and Meade, Inc. botanists observed this species along Highway 58 west of the Carrizo Plain in late April 2010 (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined gypsum-loving larkspur does not occur within the Project Site (Althouse and Meade 2010b), though suitable habitat of untilled annual grasslands does occur.

Recurved Larkspur (*Delphinium recurvatum*) is a CNPS List 1B.2 species endemic to California that occurs in scattered populations throughout the San Joaquin Valley, reaching its southern distribution limit in the Carrizo Plain. It is common in chenopod scrub habitat in the Carrizo Plain National Monument in areas that are not overgrazed. The nearest documented occurrences include two locations in California Valley approximately 3.0 to 3.5 miles southeast of the Project Site. Surveyors visited a reference site on April 2, 2010, at Belmont Trail and Clarksburg Road in California Valley to observe this species in bloom. Surveyors also observed it blooming along Seven Mile Road on April 16, 2009. Moderate to poor quality habitat for this species is present in areas of the Project Site that have not been plowed recently (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined recurved larkspur does not occur within the Project Site (Althouse and Meade 2010b).

Temblor Buckwheat (*Eriogonum temblorense*) is a CNPS List 1B.2 species known from barren slopes extending through the Temblor range and adjoining hills north to Parkfield and Cottonwood Pass, where it typically blooms from May through September. The nearest reported occurrence to the Project Site is a specimen from 1955 from approximately 11.6 miles northeast of the Project Site. CNDDB records report the species growing in shale sandstone and clay substrates. Marginally appropriate habitat is present on hill slopes in the north end of Section 16 (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined Temblor buckwheat does not occur within the Project Site (Althouse and Meade 2010b).

Spiny-sepaled Button-celery (*Eryngium spinosepalum*) is currently a CNPS List 1B.2 species, with a recently revised range that extends from Kern County north to Fresno County and into the west side of the valley as far as Contra Costa County and into eastern San Luis Obispo County (Althouse and Meade 2010b). Molecular data and inspection of additional specimens indicate that the species may be less rare than previously presumed (Althouse and Meade 2010b). The nearest reported occurrences of spiny-sepaled button-celery in the CNDDB are from Tulare County, which is more than 40 miles northeast of the Project Site. However, collections have been made near the Carrizo Plain, approximately two miles from the Project Site. Appropriate habitat for the species is present in vernal pools within the Project Site, and the species was observed in Study Area A (Althouse and Meade 2010b).

Diamond-petaled California Poppy (*Eschscholzia rhombipetala*) is a CNPS List 1B.1 species reported to occur (or once occurred) in Alameda, Contra Costa, Colusa, San Joaquin, Stanislaus, and San Luis Obispo Counties. It occurs on alkaline clay soils on slopes or flats. Most of the historic localities for this species no longer occur. The diamond-petaled California poppy is presently known from two populations, one in Livermore, and one in the Carrizo Plain. Two

CNDDB records from San Luis Obispo County are questionable and have likely been extirpated. The diamond-petaled California poppy was rediscovered on the Carrizo Plain by Dr. David Keil in 1992 and was not seen again after 1995 until its rediscovery in 2010 (Althouse and Meade 2010b).

During botanical surveys of the Project Site in March and April 2010 a new population of the diamond-petaled California poppy was detected, taxonomically verified, and mapped. This small, isolated population is outside both Study Areas A and B, occurring just outside the Study Area A boundary, in the southwest quarter of Section 5 (Althouse and Meade 2010b).

Santa Lucia Dwarf Rush (*Juncus luciensis*) is a CNPS List 1B.2 species known from vernal pools, ephemeral drainages, wet meadows, and streamsides in coastal counties from San Diego County north to Monterey County, as well as interior areas from Placer County north through Modoc County. It blooms from April through July. This annual rush is reported from two occurrences in San Luis Obispo County, a 2001 collection from a clay vernal pool at Camp Roberts 44 miles northwest of the Project Site, and a 1958 collection from Creston Road near Paso Robles, approximately 32 miles northeast of the Project Site. Appropriate habitat is present within the Project Site and individuals occur in two vernal pools in Section 4 (Althouse and Meade 2010b).

Ferris' Goldfields (*Lasthenia ferrisiae*) is a CNPS List 4.2 species that typically occurs in vernal pools and alkali flats in the San Joaquin Valley. Surveyors visited a known reference site at the corner of Belmont Trail and Clarksburg Road in California Valley on March 15, 2010, and observed Ferris' goldfields in bloom (Althouse and Meade 2010b). Suitable habitat is found in the vicinity of the Project Site, and individuals occur in Study Areas A and B, Sections 5, 28, and 33.

Coulter's Goldfields (*Lasthenia glabrata* ssp. *coulteri*) is a CNPS List 1B.1 species that typically blooms from February through June. Near the coast, it occurs in salt marsh habitats and alkaline soils on coastal bluffs. In inland areas Coulter's goldfields occurs on alkaline soils in playas, sinks, grasslands, and vernal pools. The closest reported occurrence is from 1950, approximately 7.5 miles west of the Project Site. The exact location is unknown and is mapped at the headwaters of Yeguas Creek. Moderately suitable habitat is present for Coulter's goldfields in mesic grassland areas of the Project Site (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined Coulter's goldfields do not occur within the Project Site (Althouse and Meade 2010b).

Pale Yellow Layia (*Layia heterotricha*) is a CNPS List 1B.1 species known from alkaline or clay soils in cismontane woodland, chaparral, and grassland habitats of central California. In San Luis Obispo County this species occurs in the La Panza Range, Elkhorn Hills, Carrizo Plain, the Temblor Range, and the vicinity of

Lake Nacimiento. The nearest recorded occurrence is approximately seven miles southwest of the Project Site. Found in 1937, this occurrence is mapped between Willow Canyon and Beartrap Creek. Moderate to poor quality habitat is present in annual grasslands within the Project Site. URS reported a single individual pale yellow layia plant occurring in Section 28 of the Project Site in 2008. However, a voucher was not collected, thus identification of the species cannot be verified by an expert (Althouse and Meade 2010b). Botanical surveys during 2010 identified a similar species, Sierran tidy tips (*Layia pentachaeta* ssp. *albida* – identification of specimen verified by Dr. David Keil). It is possible the URS survey misidentified Sierran layia (*L. pentachaeta* ssp. *albida*) as pale yellow layia (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined pale yellow layia does not occur within the Project Site (Althouse and Meade 2010b).

Munz's Tidy-tips (*Layia munzii*) is a CNPS List 1B.2 species that occurs in Fresno, Kern, and San Luis Obispo Counties. It typically occurs in chenopod scrub and grassland habitats on alkaline clay soils. The nearest recorded occurrence is from 1932 and is located approximately six miles northeast of the Project Site. At this location it occurs on rolling plains in the Yeguas Hills, between Choice Valley and Carrizo Plain. Appropriate soils are present within the Project Site for Munz's tidy-tips. Surveyors visited a reference site along Belmont Trail in California Valley on April 15, 2008, March 30, 2009, and March 15, 25, and 26, 2010, to observe this species in bloom and to review the key characteristics differentiating this species from common tidy-tips (*Layia platyglossa*). Common tidy-tips are widespread in grassland and some fallow cropland habitats within the Project Site. Most of the suitable habitat within the Project Site is highly disturbed from farming and grazing, which reduces the quality of the habitats for Munz's tidy-tips (Althouse and Meade 2010b). However, Munz's Tidy-tips have been observed within the Project Site.

Jared's Peppergrass (*Lepidium jaredii* ssp. *jaredii*) is a CNPS List 1B.2 subspecies with existing populations in the CNDDB known only from the vicinity of Soda Lake on the Carrizo Plain in San Luis Obispo County and Devil's Den in Kern County. Jared's peppergrass occurs in grasslands and alkali bottoms, slopes, and washes, where it blooms from March to May. Suitable habitat may be found in Section 4. Surveyors observed the species in bloom at a reference site on April 25, 2010, on Belmont Trail in California Valley. This reference site represents the closest occurrence, approximately 4.5 miles southeast of the Project Site, for Jared's peppergrass (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined Jared's peppergrass does not occur within the Project Site (Althouse and Meade 2010b).

Showy Madia (*Madia radiata*) is a CNPS List 1B.1 species known to occur in interior areas of California from Contra Costa County to northeastern Santa

Barbara County. Showy madia occurs in grassland, woodland, and chenopod scrub habitats, usually on clay soils. Suitable habitat is present in the vicinity of the Project Site. The nearest recorded occurrence is approximately 4.8 miles northeast of the Project Site. It was found in 1965 growing in clay soils on a broad grassland hillside at the head of Bitterwater Creek in the Pinole Hills. Surveyors observed the species in full bloom at a reference site on Soda Lake-San Diego Creek Road on March 26 and April 6, 2010 (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined showy madia does not occur within the Project Site (Althouse and Meade 2010b).

San Joaquin Woollythreads (*Monolopia congdonii*) is a federally listed endangered species and CNPS List 1B.2 that occurs in interior areas of the southern San Joaquin Valley, extending westward into San Luis Obispo County. San Joaquin woollythreads occurs in grassland and chenopod scrub habitats, typically in sandy or loamy alkaline soils, where it blooms from February to May. Suitable habitat occurs in Sections 4 and 5. The nearest recorded occurrence is a 1954 collection from approximately 14 miles east-northeast of the Project Site, a site that is now presumed extirpated. This species is also reported from the Carrizo Plain National Monument, beginning approximately 19 miles southeast of the Project Site. A reference population in the monument was visited on March 26, 2010, where this species was observed in flower (Althouse and Meade 2010b).

Botanical surveys conducted through July 2010 determined the San Joaquin woollythreads does not occur within the Project Site (Althouse and Meade 2010b).

Paso Robles Navarretia (*Navarretia jaredii*) is a CNPS List 4.3 species endemic to Monterey and San Luis Obispo Counties. The species grows in a variety of soils in areas with little competition from annual grasses. Its rarity status relates to the limited distribution of the species, but it may be found abundantly within this range in appropriate conditions. The closest known locality for this species is approximately 1.5 miles northwest of the Project Site, although the species was observed in Study Areas A and B. This species may be taxonomically revised, potentially resulting in its inclusion as part of a much more common species that does not meet criteria to remain on CNPS List 4 (Althouse and Meade 2010b).

Shining Navarretia (*Navarretia nigelliformis* ssp. *radians*) is a CNPS List 1B.2 species known from Fresno, Merced, Monterey, San Benito, and San Luis Obispo Counties. Shining navarretia reportedly grows in vernal pools, valley and foothill grassland, and woodland habitats. The species has been observed in eastern Paso Robles in recent years approximately 32 to 35 miles northwest of the Project Site. The closest known locality for this species is a 2003 collection from near Creston, approximately 28 miles west-northwest of the Project Site (Althouse and Meade 2010b).

Shining navarretia occurs in one small location just outside the boundary of Study Area A, Section 5, and consists of approximately 100 plants.

Special Status Wildlife

Thirty-one special status wildlife species could potentially occur within the Project Site based on availability of suitable habitat. These species are listed in **Table 3-18**, Special Status Wildlife Species with the Potential to Occur at the Project Site. Twenty-four special status wildlife species were identified within the Project Site. Three federally listed species were found: longhorn fairy shrimp, vernal pool fairy shrimp, and San Joaquin kit fox. One federally proposed threatened species, mountain plover, was also observed. A detailed account of each potentially occurring species is presented below. Habitat for most special status wildlife has been affected by current land use practices such as agriculture and ranching.

Invertebrates

Vernal Pool Fairy Shrimp is a federally listed threatened species, and Longhorn Fairy Shrimp is a federally listed endangered species; neither is listed under the CESA. These rare fairy shrimp occur in vernal pools and other ephemeral pool types in the Carrizo Plain region. Appropriate seasonal aquatic habitat is present for fairy shrimp in various ephemeral pool types throughout the Project Site. Both species occur in the vicinity of the Project Site.

Kern Primrose Sphinx Moth (*Euproserpinus euterpe*) is a federally listed threatened species known from Ventura, Santa Barbara, Kern, and San Luis Obispo Counties. This sphinx moth is a medium-sized, day-flying moth that has been found in cropland, hedge rows, grassland, herbaceous areas, shrubland, chaparral, and open weedy areas in desert scrub. The sphinx moth requires the presence of the larval host plant, evening primrose (*Camissonia* ssp.). Grassland on the Project Site may provide foraging habitat for the species, although the only suitable breeding habitat is located in sandy washes within Section 4. A single-day survey in 2010 did not detect any sphinx moth adults or larvae, and no evidence of larval feeding on sandysoil suncup (*Camissonia strigulosa*) was observed (Althouse and Meade 2010b). Focused surveys for the Kern primrose sphinx moth have not been conducted.

Amphibians

Western Spadefoot Toad (*Spea hammondii*) is a California SSC known from ephemeral pools in open grassland habitats across the interior region of San Luis Obispo County. During the dry season, spadefoot toads excavate burrows up to three feet deep. Sandy, gravelly, or other crumbly (friable) soil types are a prerequisite to spadefoot toad occurrence. While in the burrows, the toads are completely surrounded by soil and are likely in a state of torpor (inactivity) (USFWS 2005 in Althouse and Meade 2010b). Between February and May spadefoot toads emerge from their burrows and move into ephemeral pools to

TABLE 3-18
SPECIAL STATUS WILDLIFE SPECIES WITH THE POTENTIAL TO OCCUR AT THE PROJECT SITE

SPECIES	STATUS	NESTING/ BREEDING PERIOD	HABITAT PREFERENCE	POTENTIAL HABITAT IN PROJECT SITE?	DETECTED AT PROJECT SITE? (Y/N)
Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Federal: T Global/State:G3 /S2S3 CDFG: Special Animal	Rainy season	Clear water sandstone depression pools, grassed swale, earth slump, or basalt flow depression pools.	Yes. Moderate to poor quality aquatic habitat is present in ephemeral pools in grassy swales.	Yes – Study Area A
Longhorn Fairy Shrimp *Branchinecta longiantenna*	Federal: E Global/State:G1 /S1 CDFG: Special Animal	Rainy season	Small clear water depressions in sandstone, and clear to turbid clay/grass-bottomed pools in shallow swales.	Yes. Suitable aquatic habitat is present in ephemeral pools.	Yes – Study Areas A and B
Kern Primrose Sphinx Moth *Euproserpinus euterpe*	Federal: T Global/State:G1 /S1 CDFG: Special Animal	Spring	Host plant is evening primrose (*Camissonia contorta epilobioides*) and potentially other Camissonia species.	Yes. Potential habitat is only present in sandy washes in Section 4.	No
Western Spadefoot Toad *Spea hammondii*	Global/State: G3?/S3? CDFG: SSC	January through August	Vernal pools in grassland and woodland habitats.	Yes. Suitable breeding habitat may be present in ephemeral pools.	Yes – Study Areas A and B
Blunt-nosed Leopard Lizard *Gambelia sila*	Federal: E State: E Global/State:G1 /S1 CDFG: Fully Protected	Spring	Semiarid grasslands, alkali flats, and washes; 30 to 730 meters.	Yes. However, most areas are too disturbed. Grasslands are generally too densely vegetated, with no shrub cover. Suitable burrows are present.	No
San Joaquin Whipsnake *Masticophis flagellum Ruddocki*	Global/State:G5 T2T3/S2? CDFG: SSC	May	Open, dry, treeless areas, including grasslands and saltbush scrub; takes refuge in burrows and under shaded vegetation.	Yes. Moderately suitable habitat is present.	Yes – Study Area A
Blainville's (Coast) Horned Lizard *Phrynosoma blainvillii*	Global/State:G4 G5/S3S4 CDFG: SSC	May through September	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes.	Yes. Suitable habitat is present.	No
Grasshopper Sparrow *Ammodramus savannarum*	Global/State:G5 /S2 CDFG: SSC (Nesting)	March 15-August 15	Nests in grassland habitats on mountain slopes, foothills, and valleys. May nest colonially.	Yes. Suitable nesting habitat.	Yes – Study Area B

TABLE 3-18 *(continued)*
SPECIAL STATUS WILDLIFE SPECIES WITH THE POTENTIAL TO OCCUR AT THE PROJECT SITE

SPECIES	STATUS	NESTING/ BREEDING PERIOD	HABITAT PREFERENCE	POTENTIAL HABITAT IN PROJECT SITE?	DETECTED AT PROJECT SITE? (Y/N)
Golden Eagle *Aquila chrysaetos*	Global/State:G5 /S3 CDFG: SSC, Fully Protected	March 15 through August 15	Nests in large, prominent trees in valley and foothill woodland. Requires adjacent food source.	Yes. Potential and very limited nesting on a few power towers, few perches at abandoned ranch sites, and foraging habitat are present.	Yes – foraging within Study Areas A and B, no nests on-site.
Short-eared Owl *Asio flammeus*	Global/State:G5 /S3 CDFG: SSC (Nesting)	March 15 through August 15	Fresh and salt swamps, lowlands. Nests on dry ground in tules/tall grasses.	Yes. Suitable wintering habitat is present; poor nesting habitat due to lack of tall grass.	No
Long-eared Owl *Asio otus*	Global/State:G5 /S3 CDFG: SSC (Nesting)	March 15 through August 15	Roost and nest in woodlands; require adjacent open land productive of mice and the presence of old nest of crows, hawks, or magpies for breeding.	Yes. Suitable nesting, roosting, and foraging habitat areas are present.	No
Burrowing Owl *Athene cunicularia*	Global/State:G4 /S2 CDFG: SSC	February 1 through August 31	Burrows in squirrel holes in open habitats with low vegetation.	Yes. Suitable wintering and nesting habitat is present.	Yes – Study Areas A and B
Ferruginous Hawk *Buteo regalis*	Global/State:G4 /S3S4 CDFG: Special Animal (Wintering)	October through April	Winters locally in open grassland or savannah habitats. More common in interior San Luis Obispo County than coast.	Yes. Suitable wintering habitat is present. Does not nest locally.	Yes – Study Areas A and B
Mountain Plover *Charadrius montanus*	Federal: P Global/State:G2 /S2? CDFG: SSC (Wintering)	November through February	Short grasslands, plowed fields, etc. Winters locally, does not nest in San Luis Obispo County.	Yes. Winters in the Carrizo Plain National Monument, and could occur within the Project Site.	Yes – Study Area A
Lark Sparrow *Chondestes grammacus*	Global/State:G5 /SNR CDFG: Special Animal (Nesting)	March 15 through August 15	Nests on the ground near edges of grasslands and tree or shrublands.	Yes. Suitable nesting habitat is present.	Yes – Study Area A
White-tailed Kite *Elanus leucurus*	G5/S3 Fully Protected	March 15 through August 15	Nests in dense tree canopy near open foraging areas.	Yes. Potentially suitable nesting habitat may be present in landscape trees in Sections 16, 18, 28, 33.	No
Merlin *Falco columbarius*	Global/State:G5 /S3 CDFG: Special Animal (Wintering)	September through April	Winters on seacoasts, estuaries, woodlands, savannas, grassland edges, deserts. Winters locally, does not nest in San Luis Obispo County.	Yes. Suitable wintering habitat is present.	Yes – Study Areas A and B

TABLE 3-18 *(continued)*
SPECIAL STATUS WILDLIFE SPECIES WITH THE POTENTIAL TO OCCUR AT THE PROJECT SITE

SPECIES	STATUS	NESTING/ BREEDING PERIOD	HABITAT PREFERENCE	POTENTIAL HABITAT IN PROJECT SITE?	DETECTED AT PROJECT SITE? (Y/N)
Lesser Sandhill Crane *Grus canadensis canadensis*	Global/State:G5 T4/SNR CDFG:SSC (Wintering)	N/A	Feeds in short-grass plains and grain fields and roosts in groups in moist fields or shallow water.	Yes. Suitable foraging habitat may be present on farm fields.	No
Greater Sandhill Crane *Grus canadensis tabida*	State: T G5T4/S2 CDFG: Special Animal	N/A	Feeds in short-grass plains and grain fields and roosts in groups in moist fields or shallow water.	Yes. Suitable foraging habitat may be present on farm fields.	No
California Condor *Gymnogyps californianus*	Federal: E State: E Global/State:G1 /S1 CDFG: Special Animal	March 15 through August 15	Wide-ranging over Coast Ranges from Ventura to Big Sur, California.	Yes. Condors likely pass over the area on occasion, and could feed locally on carrion when available.	No
Bald Eagle *Haliaeetus leucocephalus*	Federal: D State: E Global/State:G4 /S2 CDFG: Special Animal	March 15 through August 15	Nests within one mile of water in tall live tree with open branches.	Yes. Migrant or transient bald eagles do occasionally forage on Carrizo Plain. Suitable nesting habitat is not present within the Project Site or vicinity.	Yes – Study Areas A and B; Wintering Only
Loggerhead Shrike *Lanius ludovicianus*	Global/State:G4 /S4 CDFG: SSC (Nesting)	March 15 through August 15	Open areas with appropriate perches, near shrubby vegetation for nesting.	Yes. Nesting and foraging habitat is present. Detected in breeding bird surveys.	Yes – Study Areas A and B
Oregon Vesper Sparrow *Pooecetes gramineus affinis*	Global/State:G5 T?/S? CDFG: SSC (Wintering)	March 15 through August 15	Winters in grassland habitats and may frequent agricultural fields.	Yes. Suitable wintering habitat is present; does not breed locally.	Yes – Study Areas A and B
Tricolored Blackbird *Agelaius tricolor*	Global/State:G2 G3/S2 CDFG: SSC (Nesting)	March 15-August 15	Requires open water, protected nesting substrate, and foraging area with insect prey near nesting colony.	No nesting habitat. Wintering habitat is present.	Yes - wintering only in Study Areas A and B
Swainson's Hawk *Buteo swainsoni*	State: T Global/State:G5 /S2 CDFG: Special Animal (Nesting)	March 15 through August 15	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, agricultural fields. Does not nest in San Luis Obispo County; occurs as seasonal migrant or transient in Carrizo Plain.	No. Suitable nesting habitat is not present. Uncommon migrant in Carrizo Plain.	Yes – Study Area A, migrant only

TABLE 3-18 *(continued)*
SPECIAL STATUS WILDLIFE SPECIES WITH THE POTENTIAL TO OCCUR AT THE PROJECT SITE

SPECIES	STATUS	NESTING/ BREEDING PERIOD	HABITAT PREFERENCE	POTENTIAL HABITAT IN PROJECT SITE?	DETECTED AT PROJECT SITE? (Y/N)
Northern Harrier *Circus cyaneus*	Global/State:G5 /S3 CDFG:SSC (Nesting)	March 15 through August 15	Nests on ground in shrubby areas, usually near water. Forages in open areas.	No. Grasslands within the Project Site do not have grass tall enough to attract nesting harriers.	Yes – Study Areas A and B; Wintering only
Prairie Falcon *Falco mexicanus*	Global/State:G5 /S3 CDFG: Special Animal (Nesting)	March 15 through August 15	Inhabits dry, open terrain. Nests on cliffs near open areas for hunting.	No. Suitable nesting habitat is not present. Foraging habitat is present.	Yes – Study Areas A and B
Long-billed Curlew *Numenius americanus*	Global/State:G5 /S2 CDFG: Special Animal (Nesting)	March 15 through August 15	Breeds in upland short grass prairies in NE California. Favors gravelly habitats on rolling terrain.	No. This species does not breed locally, but does winter in Carrizo Plain and forages within the Project Site.	Yes – Study Areas A and B; Wintering only
Yellow-headed Blackbird *Xanthocephalus xanthocephalus*	Global/State:G5 /S3S4 CDFG: SSC (Nesting)	March 15 through August 15	Nests in freshwater emergent wetlands with dense vegetation and deep water.	No. This species does not nest locally, but may be present as a rare transient during migration.	Yes – Study Area B; Winter transient
Nelson's Antelope Squirrel *Ammo-spermophilus nelsoni*	State: T Global/State:G2 /S2 CDFG: SSC	Late winter to early spring	Dry, sparsely vegetated loamy soils in Western San Joaquin Valley; 200 to 1,200 feet.	Yes. Habitat within the Project Site is highly disturbed. No current records from vicinity.	No
Pallid Bat *Antrozous pallidus*	Global/State:G5 /S3 CDFG: SSC	Spring - Summer	Rock crevices, caves, tree hollows, mines, old buildings, and bridges.	Yes. Potentially suitable roosting habitat may be present in old buildings.	No
Giant Kangaroo Rat *Dipodomys ingens*	Federal: E State: E Global/State:G2 /S2 CDFG: Special Animal	Spring - Summer	Sandy loamy soil on level and gently sloping ground with annual grasses, forbs, and scattered shrubs.	Yes. Potentially suitable habitat may be present.	No
Short-nosed Kangaroo Rat *Dipodomys nitratoides brevinasus*	Global/State:G3 T1T2/S1S2 CDFG: SSC	Spring - Summer	Grasslands with scattered shrubs, desert shrub association on powdery soils.	Yes. Potentially suitable habitat may be present.	No
Tulare Grasshopper Mouse *Onychomys torridus tularensis*	Global/State:G5 T1T2/S1S2 CDFG: SSC	May through July	Hot arid valleys and scrub deserts in southern San Joaquin Valley. Eats arthropods.	Yes. Suitable habitat is present.	Yes – Study Areas A and B

TABLE 3-18 *(continued)*
SPECIAL STATUS WILDLIFE SPECIES WITH THE POTENTIAL TO OCCUR AT THE PROJECT SITE

SPECIES	STATUS	NESTING/ BREEDING PERIOD	HABITAT PREFERENCE	POTENTIAL HABITAT IN PROJECT SITE?	DETECTED AT PROJECT SITE? (Y/N)
McKittrick Pocket Mouse *Perognathus inornatus neglectus*	Global/State:G4 T2T3/S2S3 CDFG: Special Animal	n/a	Arid annual grasslands and desert scrub communities. Needs friable soils for digging.	Yes. *Perognathus inornatus* was identified within the Project Site, and is presumed to be ssp. *neglectus* based on range.	Yes – Study Areas A and B
American Badger *Taxidea taxus*	Global/State:G5 /S4 CDFG: SSC	February through May	Needs friable soils in open ground with abundant food source such as California ground squirrels.	Yes. Suitable foraging and denning habitat is present.	Yes – Study Areas A and B
San Joaquin Kit Fox *Vulpes macrotis mutica*	Federal: E State: T Global/State:G4 T2T3/S2S3 CDFG: Special Animal	December through July	Annual grasslands or grassy open stages with scattered shrubby vegetation. Needs loose-textured sandy soil and prey base.	Yes. Suitable foraging and denning habitat is present within the Project Site.	Yes – Study Areas A and B

Status:
Federal: Endangered (E), Threatened (T), Proposed (P), or Delisted (D) listing under the federal Endangered Species Act
State: Endangered (E) or Threatened (T) listing under the California Endangered Species Act
Global/State: NatureServe ranking system. Utilizes a numbered hierarchy from one to five following the Global (G-rank) or State (S-rank) category where 1=Critically Imperiled and 5=Secure. In cases where an uncertainty exists in the designation, a question mark (?) is placed after the rank. Full details available at natureserve.org.
CDFG: *Special Animals:* "species at risk" or "special status species." Listed or proposed for listing under the California and/or federal Endangered Species Acts, but they may also be species deemed biologically rare, restricted in range, declining in abundance, or otherwise vulnerable.
SSC: California Species of Special Concern. Considered rare or declining in abundance in California. Intended to provide the CDFG, biologists, land planners, and managers with lists of species that require special consideration during the planning process in order to avert continued population declines and potential costly listing under federal and state endangered species laws. For many species of birds, the primary emphasis is on the breeding population in California. For some species that do not breed in California but winter here, emphasis is on wintering range.
Fully Protected: Species considered by CDFG as rare or faced with possible extinction. May not be taken or possessed at any time and no provision of the CDFG code authorizes the issuance of permits or licenses to take any fully protected species.

breed. Larval development is typically completed in three to eleven weeks. Shallow warm pools with short inundation periods facilitate faster larval development. After metamorphosis is complete, the young spadefoot toads disperse into the surrounding upland habitat. Little is known about dispersal distances, or minimum habitat size requirements to support a local population. The nearest reported occurrence of the Western spadefoot toad is from approximately 4.9 miles southeast of the Project Site along Soda Lake Road (Althouse and Meade 2010b).

Fourteen Western spadefoot toad breeding localities were documented within the Project Site in 2010. Of the 14 breeding localities, only three pools contained water long enough for successful metamorphosis in 2010 (Althouse and Meade 2010b).

Reptiles

Blunt-nosed Leopard Lizard (*Gambelia sila*) is a federally and state-listed endangered species. It is also a California Fully Protected Species, meaning no take may be authorized. Blunt-nosed leopard lizards live in the San Joaquin Valley and Carrizo Plain in expansive dry areas with scattered vegetation. They inhabit nonnative grassland and alkali sink scrub communities of the valley floor marked by poorly drained soils. Insects comprise the major portion of their diet, although other lizards also are eaten. They are opportunistic when foraging for animals, feeding on whatever prey they can feasibly capture and eat (Althouse and Meade 2010b).

Blunt-nosed leopard lizards use small mammal burrows such as those of ground squirrels and kangaroo rats for permanent shelter and dormancy. Seasonal activity above ground depends on weather conditions, especially temperature. The optimum activity period occurs when air temperatures are between 77 and 95°F and soil temperatures are between 86 and 122°F. The breeding season begins in April and lasts into or through June. Eggs are laid in June and July, with young emerging in August or September. The nearest recorded occurrence, from July of 1958, is located approximately 7.8 miles south of Study Area A, 9.3 miles northwest of Study Area B (Althouse and Meade 2010b).

A protocol level survey for blunt-nosed leopard lizard was conducted in 2008 on 1,584 acres of potentially suitable grassland habitat within the Project Site. Unsuitable habitat was not surveyed. The survey area included portions of the Project Site, and some surrounding lands that are no longer part of the Proposed Project. A second protocol level survey for blunt-nosed leopard lizard was conducted in 2009 in suitable grassland habitat within parcels added to the Project Site in early 2009. For each survey, all areas of potentially suitable habitat were surveyed 17 times; 12 surveys for adult blunt-nosed leopard lizard were conducted in the spring and five surveys for juveniles were conducted in the fall. In 2010, a third protocol survey was conducted on 2,010 acres within the Project Site. The blunt-nosed leopard lizard was not detected during the 2008, 2009, or 2010 protocol surveys (Althouse and Meade 2010b).

San Joaquin Whipsnake (*Masticophis flagellum ruddocki*) is a California SSC known to occur in the Sacramento Valley, San Joaquin Valley and in the South Coast Ranges. The San Joaquin whipsnake prefers open, dry, treeless areas, including grassland and saltbush scrub, and typically takes refuge in rodent burrows, under shaded vegetation, and under surface objects. Suitable habitat is present within the Project Site for the San Joaquin whipsnake. The closest occurrence reported in the CNDDB is a road-killed specimen collected on Seven Mile Road near Highway 58, approximately 10 miles southeast of the Project Site. The San Joaquin whipsnake was not observed during wildlife surveys or during the protocol survey for the blunt-nosed leopard lizard within the Project Site. However, a piece of shed snake skin found in the northeast corner of Section 28 was positively identified as a shed from a San Joaquin whipsnake. The San

Joaquin whipsnake is a highly mobile species that is likely present within the Project Site in low numbers (Althouse and Meade 2010b).

Blainville's (Coast) Horned Lizard (*Phrynosoma blainvillii*) is a California SSC. Horned lizards are found in dry habitats from coastal dunes to inland deserts. Populations in San Luis Obispo County are widespread, but the lizards are always uncommon. There are no reports of coast horned lizard in the vicinity of the Project Site; however, suitable habitat is present and horned lizards are known to occur in the Carrizo Plain. The coast horned lizard was not observed within the Project Site during wildlife surveys or during protocol surveys for the blunt-nosed leopard lizard (Althouse and Meade 2010b).

Birds

Nine special status bird species were detected during winter surveys: burrowing owl, ferruginous hawk, golden eagle, long-billed curlew, prairie falcon, tri-colored blackbird, loggerhead shrike, mountain plover, and merlin (Althouse and Meade 2010b). Four special status species, grasshopper sparrow, lark sparrow, loggerhead shrike, and burrowing owl, were observed nesting in the Project Site (Althouse and Meade 2010b).

Yellow-headed blackbird, tricolored blackbird, and Swainson's hawk were observed wintering in the project area. Since these species are considered to be winter transients on the Project Site, they are not described in detail below. In addition, suitable nesting habitat does not exist on the Project Site for northern harrier, prairie falcon, and long-billed curlew. While these species may forage and have been observed in the project area, they are considered to be rare at the Project Site and are not described in detail below.

Grasshopper sparrow *(Ammodramus savannarum*) is a California SSC that breeds in grassland habitats in San Luis Obispo County, and elsewhere in California. Grasshopper sparrows have been extirpated from much of their former range in Southern California but continue to breed locally in ungrazed grasslands. Singing male grasshopper sparrows were detected in Section 15 east of the Project Site boundary in 2009. A single singing male was detected in 2010 on hills in the northwest corner of Section 16. Grasshopper sparrows likely nest in low numbers in ungrazed annual grasslands within the Project Site (Althouse and Meade 2010b).

Golden Eagle (*Aquila chrysaetos*) is a California SSC and a California Fully Protected Species. The primary federal legislation governing golden eagles is the Bald and Golden Eagle Protection Act. Golden eagles occur throughout the western United States, Alaska, and large portions of Canada and Mexico. They occupy nearly all habitats in the western US, including deserts, grasslands, woodlands, and all but the densest forests where hunting prey is impractical (Althouse and Meade 2010b). Golden eagle is a highly adaptable species that readily occupies habitats where basic needs are met. These basic needs include

suitable nesting sites (typically large trees or cliffs), dependable food supplies, and large open areas for foraging (Althouse and Meade 2010b).

California supports both wintering and nesting golden eagle populations. In winter, regional populations increase with the influx of northern breeding individuals that migrate south. Golden eagles do not form large wintering congregations in California, as is reported for bald eagles in Alaska and elsewhere; however, they can be abundant in some regions. As the nesting season commences, territorial behaviors limit the number of golden eagles in a particular area. Territory size of a breeding pair is highly variable, depending upon the resources available. Average breeding territories reported in Southern California are approximately 36 square miles. In Northern California, territories are approximately 48 square miles (Althouse and Meade 2010b).

The Carrizo Plain region, extending from the southern tip of the Carrizo Plain National Monument to the extreme northern end of the plain north of the Project Site, and including portions of both the Temblor Range and the Caliente Range, is approximately 500,000 acres (781 square miles) in size. Based on estimated average territory sizes for Southern and Northern California, this area could support between 16 and 22 breeding pairs if sufficient nesting sites and prey availability are present.

An aerial survey for golden eagle nests was conducted and included a ten-mile radius around both the Topaz Solar Farm and CVSR Project Sites, totaling approximately 448,647 acres. The approximately 10,000-acre (15.6-square-mile) Project Site contains limited potential nesting habitat for golden eagles. Trees associated with abandoned ranch compounds are very poorly suited for golden eagle nest construction. The PG&E transmission line towers that pass through the Project Site could be utilized for nesting purposes by golden eagles; red-tailed hawks and ravens presently nest on the towers within the Project Site. There are no cliff faces or other suitable nesting areas on site. Golden eagles did not nest within the Project Site in 2008, 2009, or 2010. Grassland and cropland habitats within the Project Site are suitable foraging grounds for golden eagles, especially in winter, when the birds were observed in both Study Areas A and B. The closest active nest to Study Area A is located approximately 7.2 miles southeast, and the closest active nest to Study Area B is located approximately 8.0 miles northwest. An inactive nest was observed approximately 5.1 miles east of Study Area A (Althouse and Meade 2010b).

Short-eared Owl (*Asio flammeus*) is one of the most globally widespread of all owls (Althouse and Meade 2010b); however, it is declining in certain areas of its range and is designated as a California SSC. The short-eared owl can be active during the day and night and usually roosts and nests on the ground, concealed by tall grass or other vegetation. It is a year-round resident in select areas of California, where its breeding range fluctuates with prey availability. In winter, the California population of short-eared owls inflates dramatically with the influx

of migrants. In the winter it often roosts communally and may sometimes roost in trees.

Short-eared owls commonly prey upon small mammals such as vole, shrew, pocket gopher, and pocket mice and occasionally small birds. Short-eared owls are reported as uncommon residents in the Carrizo Plain region (Althouse and Meade 2010b). Short-eared owls were not detected within the Project Site, but could forage on the site. Habitats within the Project Site are unlikely to attract short-eared owls for nesting due to the scarcity of tall grasses and forbs (Althouse and Meade 2010b).

Long-eared Owl (*Asio otus*) is a California SSC that prefers riparian habitats and belts of live oak paralleling stream courses. The long-eared owl requires adjacent open land for foraging and the presence of old nests of crows, hawks, or magpies for breeding. Old nests are present in large trees planted within ranch compounds throughout the Project Site and may provide limited potential nesting habitat. The nearest reported occurrence is located approximately 13.8 miles southeast of the Project Site, where two adults and three fledglings were observed nesting in a blue oak near the Chimineas Ranch headquarters. Long-eared owls were not detected within the Project Site. It is possible the long-eared owl could roost on rare occasion in trees within the Project Site, but the species likely does not regularly roost on site. Long-eared owls did not nest within the Project Site in 2008, 2009, or 2010 (Althouse and Meade 2010b).

Burrowing Owl (*Athene cunicularia*) is a California SSC that prefers open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Burrowing owls usually nest in abandoned burrows of ground squirrels, badgers, or other small mammals, although they may dig their own burrow in soft soil. Primarily nocturnal, the burrowing owl hunts insects, small mammals, and birds from a perch or in low flights. During daylight hours they are often seen perched conspicuously at the entrance to their burrow. Rosenberg (Althouse and Meade 2010b) conducted a study in grassland habitats of the Carrizo Plain National Monument and found burrowing owl nests were present at an average density of one nest per 1.4 square kilometers (346 acres) of suitable nesting habitat. Nesting territories are generically defined as a 100-meter radius around an occupied nest in which the owls regularly utilize satellite burrows (Althouse and Meade 2010b). Burrowing owls show high site fidelity from year to year, and therefore it is recommended that a site be considered occupied if a burrowing owl has been observed occupying a burrow within the last three years (California Burrowing Owl Consortium 1993).

Annual grassland habitat is present within the Project Site with varying suitability for burrowing owls. Surveyors detected burrowing owls at wintering and nesting den sites in grasslands within both study areas. Nesting and wintering sites could vary from year to year (Althouse and Meade 2010b).

Ferruginous Hawk (*Buteo regalis*) is a California SSC that winters in grassland habitats in California. It does not breed in San Luis Obispo County, but is considered a sensitive wintering raptor. Ferruginous hawks choose open perches, both manmade and natural, while they are hunting. They generally feed on small mammals, snakes, insect swarms, and occasionally birds taken on the ground. Ferruginous hawks were observed roosting throughout the Project Site in grassland and bare cropland habitats (Althouse and Meade 2010b).

Mountain Plover (*Charadrius montanus*) was proposed for listing as federally threatened on June 29, 2010. Wintering birds in California are SSC. The species winters in California and nests in short-grass prairie habitats from Wyoming to New Mexico (Althouse and Meade 2010b).

The wintering population in California accounts for approximately 50 percent of the total mountain plover population (Althouse and Meade 2010b). Mountain plovers prefer short grass habitats such as heavily grazed pastures, burned fields, fallow fields, and tilled fields (without furrows). Historic wintering colonies in the Central Valley of California were often associated with kangaroo rat precincts and California ground squirrel den complexes (Althouse and Meade 2010b). Wintering (non-breeding) mountain plovers are highly nomadic. Mountain plovers occur regularly in the Carrizo Plain National Monument in low to moderate numbers (a few hundred) primarily from November through March. In winter they are regularly found in the vicinity of Panorama Road, over 20 miles south of the Project Site. Mountain plovers were observed foraging on three occasions within the Project Site during the 2010 winter season, with a maximum count of 17 individuals (Althouse and Meade 2010b).

Lark Sparrow (*Chondestes grammacus*) is a CNDDB Special Animal that is a common inhabitant of inland grassland habitats in San Luis Obispo County. Lark sparrows are usually found in open areas near trees or shrubs. They occur infrequently in the Project Site, preferring areas with more shrub development. Surveyors did not locate any nests, but expect lark sparrows were nesting in Section 8 based on observations of adult breeding behaviors in April and May of 2008 and 2009 (Althouse and Meade 2010b).

White-tailed kite (*Elanus leucurus*) is a California Fully Protected Species that nests primarily in solitary evergreen trees near meadows, marshes, or grasslands. They are often seen perched along roadsides on telephone wires or dead snags. They prey primarily on small rodents. No records of white-tailed kite exist in the vicinity of the Project Site; however, it is listed on the Bureau of Land Management's Web site for Birds of the Carrizo Plain National Monument (BLM 2010b). Evergreen trees near scattered homesteads within the Project Site could provide low-quality nesting habitat. White-tailed kites were not observed during wildlife surveys conducted throughout the Project Site (Althouse and Meade 2010b).

Merlin (*Falco columbarius*) is a CNDDB Special Animal that winters in various habitats in San Luis Obispo County. Merlin do not breed locally, but are considered a sensitive wintering raptor. Appropriate wintering habitat is present within the Project Site. The wide open spaces and abundance of wintering horned larks, savannah sparrows, and other prey provide very good foraging habitat. Merlin were observed hunting in several areas within the Project Site during 2010 winter bird surveys (Althouse and Meade 2010b).

Lesser Sandhill Crane (*Grus canadensis canadensis*) and Greater Sandhill Crane (*Grus canadensis tabida*) are uncommon winter visitors to the Carrizo Plain. The lesser sandhill crane is a California SSC, and the greater sandhill crane is a state-listed threatened species. The most common subspecies inhabiting the Carrizo Plain National Monument are lesser sandhill cranes, with approximately 5 to 10 percent of the population estimated to be greater sandhill crane. Sandhill cranes are closely associated with standing water in Soda Lake and forage in nearby farm fields. Preferred night roosting sites are associated with shallow water, an open shoreline, level terrain, and isolated locations away from human disturbance (Althouse and Meade 2010b).

Cranes have been observed flying between Soda Lake habitats and the San Joaquin Valley during the winter season. Historically, sandhill cranes were present annually at the Carrizo Plain from November to February, but numbers have dropped dramatically. No cranes have been recorded during the last four Carrizo Plain Christmas Bird Counts dating back to December 31, 2005 (Althouse and Meade 2010b). Sandhill cranes were not observed within the Project Site but could potentially forage in low numbers in the Project Site during years when Soda Lake has filled.

California Condor (*Gymnogyps californianus*) is a federally and state-listed endangered species and a California Fully Protected species. Condors utilize vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in rocky walls provide nesting sites. The California condor may forage up to 100 miles from its nightly roosting site (Althouse and Meade 2010b).

From the late 1970s until 1987, wild condors foraged in foothills bordering the San Joaquin Valley, including San Luis Obispo County. The Elkhorn Hills-Cuyama Valley-Carrizo Plain complex and the southern San Joaquin Valley were the primary feeding areas for wild condors after 1982 (Althouse and Meade 2010b).

The USFWS designated nine critical habitat areas for the California condor, including one area in San Luis Obispo County. The area in San Luis Obispo County is split into the East and West Units of the High Mountain Beartrap Condor Area. The Project Site is situated approximately 5.5 miles east of the closer 8,320-acre East Unit. The Carrizo Plain is not part of a critical habitat area for the California condor, although its proximity and potential food sources make it suitable foraging habitat (Althouse and Meade 2010b).

There is no adequate roosting or nesting within the Project Site for California condors. However, large open areas for foraging are present, and cattle and wild ungulate carcasses in the region may provide feeding opportunities that could attract condors to the Carrizo Plain periodically. The California condor could potentially feed within the Project Site if a large mammal carcass was present. Condors were not observed in the vicinity of the Project Site during the 2008, 2009, and 2010 field surveys (Althouse and Meade 2010b).

Bald Eagle (*Haliaeetus leucocephalus*) is delisted from the ESA, and is listed as endangered under CESA. The bald eagle is also a California Fully Protected Species, with additional protections provided under the Bald and Golden Eagle Protection Act. Bald eagles are wide-ranging migrants that typically nest within one mile of water. In San Luis Obispo County, there is a small nesting population of reintroduced bald eagles at Lake Nacimiento, and recent records of a nest at Santa Margarita Lake and possibly Lopez Lake. Adults and young are wide ranging and often migratory. Preferred prey is fish, although bald eagles occasionally hunt water fowl and small mammals and scavenge carrion. Migrating or transient bald eagles will hunt ground squirrels and other prey or feed on carrion on the Carrizo Plain during the non-breeding season (Althouse and Meade 2010b).

A bald eagle was observed in the vicinity of the Project Site in February 2008, and other observations were made in 2009 and 2010, described below under *Study Area A* and *Study Area B* (Althouse and Meade 2010b). These and other observations in the region suggest bald eagles occasionally forage on the Carrizo Plain during the non-breeding season; however, no breeding habitat is present (Althouse and Meade 2010b).

Loggerhead shrike (*Lanius ludovicianus*) is a California SSC that occurs widely throughout the US and breeds throughout most of central and southern California, with the exception of the Sierra Mountains and other high-elevation areas. The species breeds in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. Loggerhead shrikes require tall shrubs or trees (also using fences or power lines) for hunting perches. They also need impaling sites for prey manipulation or storage, including sharp plants or barbed wire fences (Shuford and Gardali 2008).

A nest with several fledglings was found in Section 15 in 2009 (an area once considered part of but is no longer within the Project Site), and, in 2010, two loggerhead shrike pairs nested within the Project Site detailed below under *Study Area A* and *Study Area B*. All nests were located in dense landscape plantings in anthropogenic habitat areas (Althouse and Meade 2010b).

Oregon Vesper Sparrow (*Pooecetes gramineus affinis*) is a California SSC that winters in grassland habitats in California. It nests in the Pacific Northwest from Oregon into Canada. It is considered very rare on its nesting grounds, and is a

regular but uncommon winter migrant to the Carrizo Plain and other areas of the Central Coast from mid-September to March (Althouse and Meade 2010b). Winter bird surveys conducted within the Project Site in February and March 2009 found Oregon vesper sparrows to be uncommon winter residents in mixed flocks of savanna sparrows and horned larks. They frequent weedy areas and ungrazed fence lines. Vesper sparrows were not observed during 2010 winter bird surveys within the Project Site but were seen over 15 miles north of the Project Site near the Palo Prieto Conservation Bank on April 9, 2010 (Althouse and Meade 2010b).

Mammals

Nelson's Antelope Squirrel *(Ammospermophilus nelsoni*), also known as the San Joaquin antelope squirrel, is a state-listed threatened species. It inhabits the arid grassland, shrubland, and alkali sink habitats of the San Joaquin Valley and adjacent foothills, including some portions of the Carrizo Plain. Antelope squirrels are active year-round and live in burrows that they construct themselves or that are modifications of kangaroo rat burrows. They are most active above ground between April 1 and September 30. Their diet consists mainly of insects but also includes green vegetation, fungi, and seeds. The nearest recorded occurrence is from 1969, located approximately four miles southeast of the Project Site in the Simmler USGS quadrangle along Highway 58. In May of 2008, surveyors observed Nelson's antelope squirrels at reference sites approximately 30 miles southeast of the Project Site along Elkhorn Road in the foothills of the Temblor Range (Althouse and Meade 2010b).

Protocol surveys for the Nelson's antelope squirrel were conducted concurrently with protocol surveys for the blunt-nosed leopard lizard. In consultation with Dave Hacker of the CDFG during a meeting at the San Luis Obispo CDFG office on April 17, 2008, it was agreed upon that protocol surveys for these two species could be conducted simultaneously (Althouse and Meade 2010b).

Field surveys for the Nelson's antelope squirrel covered 1,584 acres of potentially suitable habitat within the Project Site in 2008. An additional 229 acres of habitat was surveyed in 2009, and 2,010 acres were surveyed in 2010. Nelson's antelope squirrels were not detected in 2008, 2009, or 2010 (Althouse and Meade 2010b).

Pallid bat (*Antrozous pallidus*) is a California SSC. This is a large, long-eared bat occurring throughout the state from deserts to moist forests. Pallid bat is primarily a crevice-roosting species and selects roosts where they can retreat from view. They frequently occur in oak woodlands where they roost in tree cavities. These roosts are generally day or night roosts for one or a few bats. Buildings and other human-made structures may also be used as pallid bat roosts. Communal wintering or maternity colonies are more common in rock crevices and caves.

Pallid bats are known to roost and forage in the Carrizo Plain region but were not detected within the Project Site. Numerous specimens have been collected in the Carrizo Plain region, and potential roosting habitat has been identified in rock outcroppings and abandoned buildings (Althouse and Meade 2010b).

Giant Kangaroo Rat (*Dipodomys ingens*) is a federally and state-listed endangered species. It inhabits the arid southwestern edge of central California's San Joaquin Valley and adjacent valleys and plateaus of the Inner Coastal Ranges, including the Carrizo Plain. Giant kangaroo rats are skilled at digging, and are known to often change their burrows (e.g., by closing old entrances and excavating new ones). These burrows also provide shelter for the federally listed endangered blunt-nosed leopard lizard, state-listed threatened Nelson's antelope squirrel, and other animals (Althouse and Meade 2010b).

The nearest reported occurrence in the CNDDB is located approximately three miles east of the Project Site. The occurrence was recorded in 1979 and is located at the north end of the Carrizo Plain, approximately 3.5 air miles north-northeast of Simmler (Althouse and Meade 2010b).

Surveys conducted within the Project Site for the giant kangaroo rat consisted of visual burrow searches, small mammal trapping studies, and a scat and burrow measurement study. While suitable habitat may be present in the vicinity around the Project Site, the giant kangaroo rat was not observed within the Project Site and is therefore not believed to occur there (Althouse and Meade 2010b).

Short-nosed Kangaroo Rat (*Dipodomys nitratoides brevinasus*) is a California SSC that occurs in grasslands with scattered shrubs and desert shrubs on friable soils. It occurs along the western edge of the San Joaquin Valley, including in highly alkaline soils near Soda Lake. The only CNDDB record listed for San Luis Obispo County is occurrence 70, from a capture and release study conducted from 1987 to 1991 in an area between the Temblor Mountains and the Carrizo Plain. Habitats within the Project Site are poorly suited to short-nosed kangaroo rat due to the lack of shrub development and the frequent disturbance by farming operations. Small mammal trapping studies were conducted in 2008, 2009, and 2010. The short-nosed kangaroo rat does not occur within the Project Site (Althouse and Meade 2010b).

Tulare Grasshopper Mouse (*Onychomys torridus tularensis*) is a California SSC that occurs along the western margin of the Tulare Basin, including western Kern County, Carrizo Plain, along the Cuyama Valley side of the Caliente Mountains in San Luis Obispo County, and the Ciervo-Panoche region in Fresno and San Benito Counties. Tulare grasshopper mice typically inhabit hot, dry grassland and shrubland communities. They eat mostly arthropods but may take lizards, frogs, and other small rodents. The closest reported occurrence is

approximately seven miles west of the Project Site along Placer Creek where one specimen was collected in 1930.

Cropland areas of the Project Site are poorly suited to sustaining a population of the Tulare grasshopper mouse due to the regular disturbance from the farming operation and lack of shrub cover. Grassland areas of the Project Site are moderately suitable. The Tulare grasshopper mouse was detected in one location within the Project Site in 2008, in the southern end of Section 29 (Althouse and Meade 2010b).

McKittrick Pocket Mouse (*Perognathus inornatus neglectus*) is a CNDDB Special Animal which occurs on the western side of the San Joaquin valley and areas to the west in Alameda, Fresno, Kern, Merced, San Benito, San Luis Obispo, and San Joaquin Counties. The McKittrick pocket mouse prefers arid annual grasslands and desert scrub communities, where they dig burrow systems in friable soils. Diet consists mainly of seeds, but some soft-bodied insects and earthworms are eaten. McKittrick pocket mice were captured during small mammal trapping studies conducted within the Project Site in 2008, 2009, and 2010 (Althouse and Meade 2010b).

American Badger (*Taxidea taxus*) is a California SSC known from open grassland habitats throughout San Luis Obispo County and elsewhere in California. Badgers were observed within the Project Site in many locations during surveys. They are residents of grassland areas but also forage in croplands on occasion in areas where California ground squirrels have become established. They are highly mobile and could be present anywhere within the Project Site (Althouse and Meade 2010b).

San Joaquin Kit Fox (*Vulpes macrotis mutica*) is federally listed as endangered, and state-listed as threatened. The Carrizo Plain National Monument population is a core population located in San Luis Obispo County. Prior to project surveys, kit foxes were documented in the CNDDB as occurring regularly in the vicinity of the Project Site.

The San Joaquin kit fox was determined to occur within the Project Site, in both Study Areas A and B, in 2008, 2009, and 2010 (Althouse and Meade 2010b). The Project Site includes lands that are of varying quality for San Joaquin kit fox, including low to medium, medium, medium to high, and highly suitable habitat (Penrod et al. 2010). Most of the Project Site has a medium habitat suitability ranking and is highly permeable habitat (Penrod et al. 2010). Kit fox detections were lowest in active agricultural fields (croplands), and highest in annual grasslands that had not been cropped in over 20 years (Althouse and Meade 2010b).

Genetic analysis of kit fox scats identified 18 individual kit foxes within the Project Site–ten males and eight females. All kit foxes are closely related, and there are potentially two family groups (Maldonado 2010). Three natal den

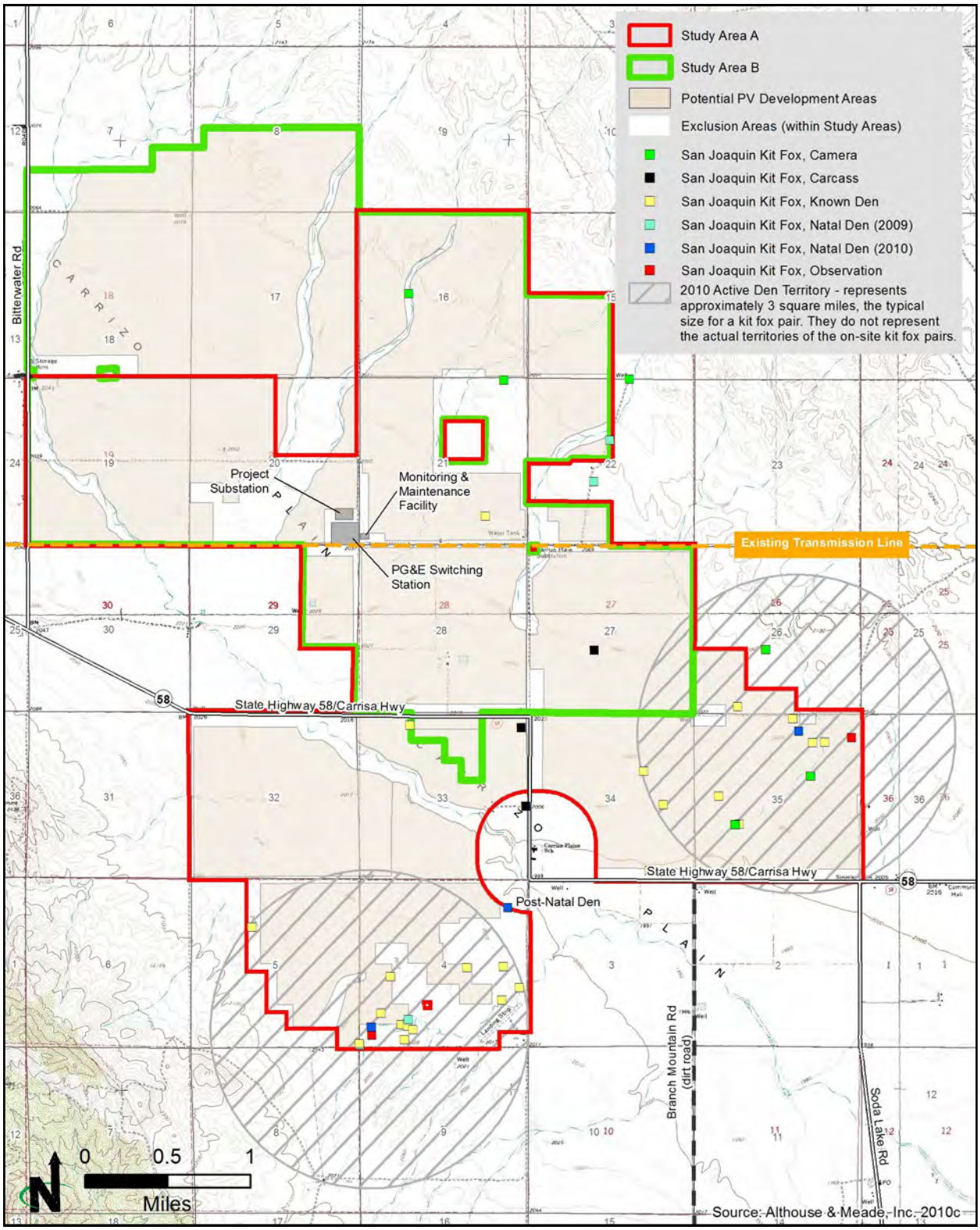
territories were identified at the Project Site in 2010, described below under *Study Area A* and *Study Area B* (**Figure 3-19**, San Joaquin Kit Fox). Other known kit fox dens were detected in Study Areas A and B, and were determined not to be natal dens (Althouse and Meade 2010b).

Study Area A

Special status species within Study Area A are similar to those described for the Project Site. Special status species detected within Study Area A are described below. Under Alternative A the Project Proponent would fence up to 4,100 acres and would not impact all habitat within the study area. Many of the species listed below are not expected to fall within the fenced area.

Special Status Plants

- Oval-leaved Snapdragon occurs in one location within Study Area A. Approximately 35 plants were found scattered in cropland habitat in the east end of Section 5 (Althouse and Meade 2010b).
- Salinas Milk-vetch occurs in scattered patches in Sections 4, 5, 15, 16, and 33 within Study Area A (Althouse and Meade 2010b).
- Round-leaved Filaree occurs as scattered patches in two locations in Sections 5 and 33 within Study Area A (Althouse and Meade 2010b).
- Spiny-sepaled button-celery was identified in one vernal pool in Section 4 within Study Area A (Althouse and Meade 2010b).
- Santa Lucia dwarf rush occurs in two vernal pools in Section 4 within Study Area A (Althouse and Meade 2010b).
- Ferris' goldfields were detected occurring as a single plant per observation in four locations scattered in Sections 5, 28 and 33 within Study Area A (Althouse and Meade 2010b).
- Munz's tidy-tips occur in Sections 4, 5, 26, 28, 32, 33, 34, and 35 within Study Area A (Althouse and Meade 2010b).
- Paso Robles navarretia was detected in Sections 4, 5, 28, 32, 33 and 34 within Study Area A (Althouse and Meade 2010b).
- Shining navarretia was detected in a swale near the southwestern corner of Section 5. Approximately 100 individuals were observed in a single patch. The occurrence of shining navarretia in the Project Site may indicate a range extension for the subspecies by more than 20 miles southeast of previous collections, based on searches of catalogued herbarium specimens and the CNDDB (Althouse and Meade 2010b).



Genetic analysis of kit fox scat identified 18 individual kit foxes within the Project Site–ten males and eight females.

San Joaquin Kit Fox

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-19

Special Status Wildlife

- Invertebrates:
  - Vernal pool fairy shrimp were detected in 11 vernal pools in Section 4, and longhorn fairy shrimp were detected in 2 pools (one vernal pool, one natural non-wetland pool) in Section 20 during protocol wet season surveys in the winter of 2010. Other pools in Sections 4, 19, 20, and 35 are mapped as potential habitat for these listed fairy shrimp (Althouse and Meade 2010b).
- Amphibians and Reptiles:
  - Western spadefoot toad tadpoles were observed in agricultural reservoirs in Sections 20 and 28, plunge pools in an ephemeral drainage in Section 33, and in vernal pools in Section 4 (Althouse and Meade 2010b).
- Birds:
  - Golden eagle was observed foraging within Study Area A. In addition, limited potential nesting habitat exists on PG&E transmission line poles (Althouse and Meade 2010b).
  - Study Area A contains suitable habitat for the burrowing owl, and surveyors detected burrowing owls at wintering and nesting den sites in grasslands within Study Area A. Four active nests were observed in Study Area A in 2010 (Sections 4, 28, 35). An additional three nests were located immediately adjacent to and outside of the Project Site (Althouse and Meade 2010b).
  - In 2010, lark sparrow fledglings were observed in Sections 5 and 32, where they presumably nested in the adjacent olive grove (Althouse and Meade 2010b).
  - A sub-adult bald eagle was observed in Section 32 within Study Area A in February 2010 (Althouse and Meade 2010b).
  - In 2010, a loggerhead shrike pair nested in Section 33 within Study Area A (Althouse and Meade 2010b).
  - Mountain plovers were observed foraging on three occasions within the Study Area A during the 2010 winter season, with a maximum count of 17 individuals (Althouse and Meade 2010b).
  - Wintering species (including winter transients) observed within Study Area A include merlin, tri-colored blackbird,

long-billed curlew, northern harrier, ferruginous hawk, sharp-shinned hawk, and osprey (Althouse and Meade 2010b).

- Mammals:
  - Potentially suitable roost areas for pallid bat within Study Area A are located in buildings within Sections 16, 22, 27, 28, and 33. Visual surveys of structures in Sections 27, 28, and 33 found no evidence of roosting bats. Structures in Sections 16 and 22 are not abandoned and were not surveyed. Pallid bats may forage in grassland and cropland habitats within the Project Site seasonally, but likely do not roost on site (Althouse and Meade 2010b).
  - All or portions of Sections 19, 20, 21, and 22 in Study Area A are actively cropped, and very few San Joaquin kit fox detections were made in these areas. The grassland habitats in Sections 4, 5, 34, and 35 have been in the CRP for at least 20 years and kit fox were detected frequently in these sections. They were also detected in the cropland and recovering cropland in Sections 28, 32, and 33 (Althouse and Meade 2010b).
  - Three San Joaquin kit fox natal den territories were identified in Study Area A (Figure 3-19). One is located in Section 22, one is near the boundary of Sections 4 and 5, and the third is in the northeast corner of Section 35 (Althouse and Meade 2010b). Other known kit fox dens were detected in Sections 4, 5, 21, 26, 33, 34, and 35 and were determined not to be natal dens (Althouse and Meade 2010b).
  - Other observed special status mammal species within Study Area A include Tulare grasshopper mouse, McKittrick pocket mouse, and American badger (Althouse and Meade 2010b).

Study Area B

The types of special status species within Study Area B are similar to those described for Study Area A, although not all species were detected in both study areas. Under Alternative B, the Project Proponent would fence up to 4,000 acres and would not impact all habitat within Study Area B. Special status species that were detected within Study Area B are described below.

Special Status Plants

- Salinas Milk-vetch occurs in Sections 15 and 16 within Study Area B (Althouse and Meade 2010b).
- Ferris' goldfields were detected occurring as a single plant per observation in two locations in Section 28 within Study Area B (Althouse and Meade 2010b).
- Munz's Tidy-tips occur in Sections 28 and 33 within Study Area B (Althouse and Meade 2010b).
- Paso Robles navarretia was detected in Section 28 within Study Area B (Althouse and Meade 2010b).

Special Status Wildlife

- Invertebrates:
  - Vernal pool fairy shrimp were not detected within Study Area B. Longhorn fairy shrimp were detected in two pools (one vernal pool, one natural non-wetland pool) in Section 20. Within Study Area B, other pools in Sections 19 and 20 are mapped as potential habitat for these listed fairy shrimp (Althouse and Meade 2010b).
- Amphibians:
  - Western spadefoot toad tadpoles were observed in agricultural reservoirs in Sections 20 and 28 and ephemeral pools in Section 18 (Althouse and Meade 2010b).
- Birds:
  - Grasshopper sparrow was detected in Section 16, and the species likely nests in low numbers in Study Area B (Althouse and Meade 2010b).
  - Golden eagle was observed foraging within Study Area A. In addition, limited potential nesting habitat exists on transmission line poles (Althouse and Meade 2010b).
  - Study Area B contains suitable habitat for burrowing owls, and surveyors detected burrowing owls at wintering and nesting den sites in grasslands within Study Area B. Two active nests were observed in 2010 in Study Area B (Section 28). An additional three nests were located immediately adjacent to and outside of the Project Site (Althouse and Meade 2010b).

  - Surveyors observed an adult bald eagle along Bitterwater Road at the west edge of Section 18 within Study Area B in March 2009 (Althouse and Meade 2010b).
  - In 2010, a loggerhead shrike pair nested in Section 18 within Study Area B (Althouse and Meade 2010b).
  - Wintering species (including winter transients) observed within Study Area B include merlin, tri-colored blackbird, long-billed curlew, northern harrier, ferruginous hawk, Oregon vesper sparrow, sharp-shinned hawk, and osprey (Althouse and Meade 2010b).

- Mammals:
  - Potentially suitable pallid bat roost areas within Study Area B are located in buildings within Sections 16, 18, 22, 27, and 28. Visual surveys of structures in Sections 27 and 28 found no evidence of roosting bats. Structures in Sections 16, 18, and 22 are not abandoned and were not surveyed. Pallid bats may forage in grassland and cropland habitats within the Project Site seasonally, but likely do not roost on site (Althouse and Meade 2010b).
  - All or portions of Sections 7, 8, 17, 18, 19, 20, and 21 in Study Area B are actively cropped, and very few San Joaquin kit fox detections were made in these areas (Althouse and Meade 2010b). One natal den territory in Section 22 was identified in Study Area B (Figure 3-19). Other known kit fox dens were detected in Sections 21 and 33 and were determined not to be natal dens (Althouse and Meade 2010b).
  - Other special status mammal species that were observed within Study Area B include Tulare grasshopper mouse, McKittrick pocket mouse, and American badger (Althouse and Meade 2010b).

Reconductoring

Forty-one special status wildlife species and twenty-three special status plant species were identified as having the potential to occur in the PG&E Reconductoring Project area. The PG&E Morro Bay to Midway transmission line spans 35 miles and covers a greater diversity of vegetation communities and habitats than the proposed Topaz Project. While some special status species are the same as those that could occur on the Topaz Project Site, there are notable differences. Additional special status species that could occur along the Morro Bay to Midway transmission line include Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), Le Conte's thrasher (*Toxostoma lecontei*), Kern mallow (*Eremalche*

kernensis), Hoover's eriastrum (*Eriastrum hooveri*), showy golden madia (*Madia radiata*), and golden violet (*Viola aurea*).

There are trees and shrubs in the vicinity of the PG&E transmission line, as well as transmission towers, that could provide nesting habitat for some special status bird species.

3.10.2 Environmental Impacts

For special status plants, significance criteria focus on the amount of disturbance of species habitat, as well as the potential for direct impacts on special status plant species.

Potential impacts on special status animal species could occur if the Proposed Project were to:

- Violate the ESA, Bald and Golden Eagle Protection Act, MBTA, or applicable guidance or regulations;
- Adversely affect any individual or population of federally protected species, including take of a federally protected species; or
- Substantially affect the quality or quantity of habitat available for a special status species over the long term.

Measures to reduce or eliminate impacts on special status species have been incorporated into the Proposed Action and are included in Table 2-9. These measures are summarized at the end of this section.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

The types of impacts that could occur on special status species would be similar to those described in Section 3.8, Vegetation, and Section 3.9, Wildlife. Those sections describe in greater detail the general impacts that could occur on vegetation and wildlife, which would also apply to special status species. The analysis in this section focuses on species-specific impacts on special status species. A biological assessment has been prepared for the Project, and a biological opinion is pending.

<u>Construction</u>. Construction under Alternative A would have the potential to affect the species described below.

Effects on Fairy Shrimp. Longhorn fairy shrimp and vernal pool fairy shrimp are federally listed large branchiopods that were identified within Study Area A. The Project would avoid all occurrences of these two federally listed fairy shrimp. Measures listed in Table 2-9 would be implemented to ensure that construction, operation, and decommissioning activities do not result in adverse impacts on listed fairy shrimp or their habitat. However, although the likelihood is

extremely low, Alternative A could result in adverse effects on these fairy shrimp due to the proximity and extent of construction activities.

Effects on San Joaquin Kit Fox. Potential direct and indirect short-term effects on San Joaquin kit fox would result from construction activities. These potential impacts would include displacement of San Joaquin kit fox from portions of the Project Site where they are known to be present, changes in the daily movement and hunting patterns of individual kit fox, removal of denning sites, and potential injury or mortality to individual kit fox. Traffic increases would occur during the construction phase. However, since kit fox are nocturnal, remaining in or very close to their dens during the day, an increase in traffic during daylight hours would not likely result in an increase in kit fox mortality (Althouse and Meade 2010d).

Potential short-term effects on kit fox would include the following:

- Ground disturbance from limited grading, ground surface smoothing, driving support rods, assembling arrays, and trenching could remove denning sites;
- Potential for harm to San Joaquin kit fox during construction without careful monitoring due to destruction of burrows or collision with vehicles or heavy equipment;
- Potential exclusion from the Project Site during construction due to noise and visual disturbance, as well as human presence; and
- Potential displacement of denning foxes due to disturbance caused by construction.

Impacts on San Joaquin kit fox would be minimized through implementation of measures described in Table 2-9, as well as mitigations developed through consultation with USFWS and CDFG. The proposed Kit Fox Mitigation and Monitoring Plan is included in Appendix E of the EIS.

Effects on Special Status Plant Species. Impacts on special status plants are shown in **Table 3-19**, Potential Impacts on Sensitive Status Plants Associated with Alternative A. Nine special status plant species (CNPS listed) were identified within Study Area A, and one additional species was mapped just outside the Study Area A boundary. No federally or state-listed plant species occur within Study Area A, and thus no impacts on these species would occur. Study Area A is within the range of, and contains suitable habitat and soil features for, ten other special status plant species.

TABLE 3-19
POTENTIAL IMPACTS ON SPECIAL STATUS PLANTS ASSOCIATED WITH ALTERNATIVE A

COMMON NAME *SCIENTIFIC NAME* LISTING STATUS	TEMPORARY IMPACT	PERMANENT IMPACT	OVERALL EFFECT OF PROJECT[1]
Oval-leaved snapdragon *Antirrhinum ovatum* CNPS List 4.2	Up to 35 plants could be affected during construction (100% of surveyed population in 2010)	**None** Impacted occurrence is currently within cropland. Species is expected to be present after Project installation	• Occurrence is in active cropland. High potential for expansion of existing on-site population after elimination of tilling
Salinas milk-vetch *Astragalus macrodon* CNPS List 4.3	Up to 13 plants could be affected during construction (2% of surveyed population in 2010)	**None** Impacted occurrences are expected to become re-established after construction	• This perennial species was observed to recruit to croplands in Sections 4, 5, 32, and 33, but was eliminated by fall tilling • Suitable conditions would be present within the Project Site for permanent establishment
Round-leaved filaree *California macrophylla* CNPS List 1B.1	**None** Occurrences would be avoided during construction	**None** Project facilities would not be located in occurrence areas	• Occurrences are within proposed open space • On-site populations expected to increase after Project construction due to elimination of annual tilling
Spiny-sepaled button celery *Eryngium spinosepalum* CNPS List 1B.2	**None** Only occurs in one vernal pool, which would be avoided during construction	**None** Project facilities would not be located in occurrence area	• Occurrence is within proposed open space • Project would result in protection of on-site vernal pools in perpetuity • Lands containing this species are presently in the CSP program, but no permanent protection from future farming is provided if contract is not renewed
Diamond-petaled California poppy *Eschscholzia rhombipetala* CNPS List 1B.1	**None** Occurrence is outside the Project Site and would be protected by a construction buffer	**None** Project facilities would not be located in occurrence area	• Elimination of annual tilling of the occurrence may benefit this species

TABLE 3-19 *(continued)*
POTENTIAL IMPACTS ON SPECIAL STATUS PLANTS ASSOCIATED WITH ALTERNATIVE A

COMMON NAME *SCIENTIFIC NAME* LISTING STATUS	TEMPORARY IMPACT	PERMANENT IMPACT	OVERALL EFFECT OF PROJECT[1]
Santa Lucia dwarf rush *Juncus luciensis* CNPS List 1B.2	**None** Occurs in two vernal pools, which would be avoided during construction	**None** Project facilities would not be located in occurrence area	• Occurrence is within proposed open space • Project would result in protection of on-site vernal pools in perpetuity • Lands containing this species are presently in the CSP program, but no permanent protection from future farming is provided if contract is not renewed
Ferris' Goldfields *Lasthenia ferrisiae* CNPS List 4.2	Up to 2 plants could be affected during construction (50% of surveyed population in 2010)	**None** Substantial permanent occurrence areas are not present	• Suitable conditions would be present within the Project Site for periodic and possibly permanent establishment
Munz's tidy-tips *Layia munzii* CNPS List 1B.1	Up to 16 plants could be affected during construction (2.5% of surveyed population in 2010)	**None** Substantial permanent occurrence areas would be avoided by the Project layout	• Permanent population could become established in newly created grassland in Sections 32 and 33 • Occurrences in southwest corner of Section 5 could expand into lands that are currently farmed • Sufficient room would be present within the Project Site for periodic and possibly permanent establishment
Paso Robles navarretia *Navarretia jaredii* CNPS List 4.3	Up to 1,004 plants could be affected during construction (35% of surveyed population in 2010)	**None** Impacted occurrences are expected to become re-established after construction	• High potential for expansion of existing on-site population
Shining navarretia *Navarretia nigelliformis* ssp. *radians* CNPS List 1B.2	**None** Occurrence would be avoided during construction	**None** Project facilities would not be located in occurrence area	

[1]All areas within Project fencing, roads outside of fences, monitoring and maintenance facility, substation, and switching station. Acreages listed are for a 4,100-acre Project; the area of permanent impact would be less under a reduced-acreage development scenario.

Source: Althouse and Meade 2010b

Construction activities would likely result in short-term adverse effects on special status plants occurring within the fenced area if the activities overlap the bloom periods, if perennial species are removed, or if substantial soil disturbance occurs. There is the potential for loss of oval-leaved snapdragon from the site, as 100 percent of the 2010 surveyed population could be affected by construction activities. This would occur if construction activities sufficiently disturbed or removed the seed bank to preclude future germination. However, regular soil disturbance has not appeared to affect the population in Study Area A, since the current population persists in active cropland. Fewer impacts would occur on other special status species, as a smaller proportion of the on-site population would be affected for these species (see Table 3-19). The County may require pre-construction surveys, avoidance measures, and/or compensatory mitigation to reduce the likelihood for impacts.

Effects on Special Status Reptiles and Amphibians. Construction activities that occurred in areas potentially inhabited by San Joaquin whipsnake and aestivating spadefoot toad could result in the loss of some individuals through vehicle collisions and crushing of inhabited burrows. The County may require pre-construction surveys and/or avoidance measures to reduce potential direct adverse effects on special status reptiles and amphibians.

Effects on Special Status Bird Species. Construction activities could result in nest abandonment or loss of special status bird species if appropriate mitigation measures are not implemented, as described in Section 3.9, Wildlife. Impacts would be minimized with implementation of measures described in Table 2-9.

While not known to occur in the Carrizo Plain, the California condor could be an occasional visitor during its movements between occupied habitats. Construction activities would be unlikely to adversely affect the California condor. Project construction procedures would include regular trash clean-up and removal of small metal objects such as nuts and bolts, which condors are known to ingest. Site clean-up protocols would eliminate small trash items in the very unlikely event that a condor would land within the Project boundaries.

Project construction activities are not expected to result in take or disturbance of bald or golden eagles as defined by the Bald and Golden Eagle Protection Act. As there is ample suitable foraging habitat and prey in nearby areas, these species are expected to move to those areas during construction if present in the area where construction occurs. Accordingly, the Project is not expected to cause injury to bald or golden eagles, nest abandonment, or any substantial interference with breeding, feeding, or sheltering behavior.

Effects on Special Status Small Mammals. Construction activities could impact special status small mammals through direct mortality or disturbance. Vehicles could crush individuals and construction activities could collapse inhabited burrows. In addition, construction noise and vibration could temporarily displace species from the construction area. Two special status species, the

Tulare grasshopper mouse and the McKittrick pocket mouse, were observed within Study Area A and could be impacted. Potential impacts on individuals would be unlikely to have population-level effects on special status small mammal species, since construction activities would be localized and measures described below would be implemented to reduce impacts.

American badgers and their sign were observed throughout Study Area A, including den sites and foraging areas. Construction activities would temporarily displace badgers on up to approximately 4,100 acres. Mortality or injury to badgers could occur during construction due to collisions with vehicles or heavy equipment, or destruction of burrows. Implementation of applicant proposed measures listed in Table 2-9 would reduce the potential for direct adverse effects during construction.

Construction could have short-term effects on special status species, although Alternative A would be unlikely to violate applicable laws, guidance, or regulations or take any federally protected species.

Operation. Operation under Alternative A would have the potential to affect the species described below.

Effects on San Joaquin Kit Fox. Over the long term, some level of grassland habitat would be included in the fenced area; the number of acres would depend upon the configuration of the Proposed Project. Potential long-term effects include a change in the habitat structure in the area, which could result in a decrease, increase, or maintenance of San Joaquin kit fox numbers utilizing the Project Site. A decrease in kit fox numbers would result if rodent populations were to decrease in the Project Site, if active burrows and dens were filled, if predators were able to use the solar modules for cover, or if foxes would not den near PV arrays. An increase in kit fox numbers could result if release from current farming operations created usable habitat, if foxes adjusted to solar arrays and took up residence within the array fences, if vegetative cover in the solar arrays was sufficient to support and increase rodent prey, and if array fencing provided a refuge to kit foxes from predation. Kit foxes have successfully utilized other modified habitats, such as active oil fields, orchards, and vineyards (USFWS 1998), and have been found to tolerate and acclimate quickly to disturbance (Bjurlin 2004). As such, it is possible that kit fox numbers could increase.

Blockage of movement pathways north out of the Carrizo Plain could affect kit fox as they disperse from the core population into other areas. The ESA requires that the USFWS prepare a recovery plan for listed species. The recovery plan that includes San Joaquin kit fox (USFWS 1998) identifies three core areas: Carrizo Plain, western Kern County, and Ciervo-Panoche area. Although paths taken by dispersing kit fox are not well understood, nor is the dispersal range well documented, it is most likely important that the northern Carrizo Plain continue to have movement corridors. Kit foxes have been detected in the Shandon area, San Juan Creek, and north of the Project Site on

Pinole Ranch. Kit fox are present along Bitterwater Valley Road and in the Bitterwater Valley, although it is not known how many of these foxes are resident, or whether they more frequently connect with closer fox populations to the east, rather than the Carrizo population to the south (Althouse and Meade 2010d). Evidence of kit fox has been detected in the northwest portion of the Project Site but is far less frequent than in the southeast portion.

Movement opportunity around and through the Proposed Project would continue to be present after the Project is built, and open space areas on site would have improvements to enhance kit fox movement and survival. Improvements would include removal of some existing fencing in open space areas that inhibit kit fox movement, and installation of escape dens both outside and inside of the PV array areas (Althouse and Meade 2010d). It is unknown how much the kit fox would utilize the site after the Project is built since it would no longer be an open landscape.

Potential long-term effects on kit fox would include the following:

- The Proposed Project could create a safe haven for San Joaquin kit fox by providing habitat and refuge from predators;
- PV modules could provide cover for San Joaquin kit fox predators, thus causing an increase in mortality for this species;
- PV modules would reduce the open nature of the landscape, which could make the habitat less suitable for kit fox and could cause habitat avoidance;
- Vegetative cover, as managed by the Project Proponent according to an approved vegetation management plan and habitat restoration and revegetation plan, could increase prey abundance for kit fox;
- Cessation of farming within the PV array and mitigation areas would open many square miles for San Joaquin kit fox use and would increase prey abundance and habitat quality;
- The Proposed Project could reduce habitat quantity if, in spite of converting croplands to grasslands, San Joaquin kit fox do not occupy the completed Project facility;
- A decline in kit fox numbers utilizing the Project Site if rodent populations decrease in the Project's PV array areas or the surrounding grasslands, if active burrows and dens are filled, or if foxes do not den near PV arrays;
- San Joaquin kit fox movement would not be blocked;
- Conservation easements on adjacent parcels could result in agricultural uses that are less disturbing to kit fox, such as grazing instead of dry farming; and

- Habitat enhancement measures such as artificial and escape dens and fencing that allows kit fox entrance but excludes coyotes would improve habitat.

Impacts on San Joaquin kit fox would be minimized with implementation of measures described in Table 2-9 and summarized at the end of this section.

Effects on Special Status Plant Species. The Proposed Action would result in an overall beneficial effect on special status plants. Based on field surveys, it is believed that the single most limiting factor for special status plant occurrence within the Project Site is repeated vegetation and soil disturbance related to farming practices. Termination of farming within the Project Site and implementation of land management practices designed toward increasing grassland habitat would result in a beneficial effect on all special status plant populations presently occurring within the Project Site, and potentially to other species occurring in the region. Alternative A would permanently convert the cropland habitat within the fenced area to annual grassland habitat that would potentially be suitable for special status plant establishment.

Effects on Special Status Reptiles and Amphibians. The Proposed Action could have a beneficial effect on the local populations of special status reptiles and amphibians by eliminating farming and returning the uplands to untilled annual grassland habitat.

Effects on Special Status Bird Species. Construction of the proposed solar facility within Study Area A would result in loss of grassland habitat due to array placement, affecting habitat for certain special status bird species. This habitat is used for nesting, wintering, and foraging by special status birds. However, conversion of existing cropland habitat surrounding the proposed facility to annual grassland would result in a net increase in potential grassland nesting habitat. As described in Section 3.9, Wildlife, the Proposed Project would have some medium-voltage (34.5-kV) collection system lines that would be designed with established avian protection measures so as to not present a danger for electrocution or collision by condors or raptors.

Alternative A would result in a loss of burrowing owl nesting and wintering habitat where arrays would be constructed, specifically causing displacement of several breeding pairs of burrowing owls and several wintering territories. Alternative A would potentially affect three nesting territories occupied in 2010. Much of the completed facility would not be suitable for burrowing owls due to the confined nature of the array configuration. There would be open spaces within the facility fences, and it is plausible that a small number of burrowing owls could occupy the fenced portions of the site.

Alternative A would result in a net increase of potential nesting habitat for lark sparrows by converting existing croplands to annual grasslands. The net increase in available nesting habitat would have a long-term beneficial effect on lark

sparrows. Impacts on grasshopper sparrow would be similar to those described for the lark sparrow.

The Proposed Project could result in the loss of potential nesting habitat, resulting in direct impacts on nesting loggerhead shrikes by removal of landscape plantings. The Project layout under Alternative A would not affect landscape vegetation in the two areas where loggerhead shrike nests were detected in 2010.

Alternative A would result in a net loss of golden eagle foraging habitat for the life of the Project. While the Project Site does not support golden eagle nesting habitat, several individuals were observed foraging within the Project Site throughout the year. It is expected that most of the up to 4,100-acre fenced facility would no longer be usable by foraging golden eagles, representing less than one percent of the over 500,000 acres of potential foraging habitat in the Carrizo Plain region. Due to the size of the Project compared to available foraging habitat, population-level effects on golden eagles in the region are unlikely. Though golden eagles tend to avoid developed areas, it is possible that golden eagles could hunt effectively in the larger open spaces within and immediately adjacent to the Proposed Project. Since population-level impacts are not expected and no individual take according to the Act is expected, operation of the Project is not expected to result in take or disturbance of golden eagles as defined under the Bald and Golden Eagle Protection Act.

Operation of the Project would be unlikely to adversely affect the California condor. No carcasses would be present within the fenced area that would attract condors to the site. Furthermore, Project operation procedures would include regular trash clean-up and removal of small metal objects such as nuts and bolts, which condors are known to ingest. Site clean-up protocols would eliminate small trash items in the very unlikely event that a condor would land within the fenced boundaries. Study Area A is not within a designated critical habitat area for condors. The change of use on up to approximately 4,100 acres of farming and grazing land would be a minor effect on California condor, especially considering the approximately 250,000 acres of suitable habitat within the Carrizo Plain National Monument and another 12,570 acres of protected critical habitat in the region.

Mountain plovers do not nest in the Carrizo Plain region, but were observed foraging during the winter within Study Area A. The Proposed Project would remove potential winter foraging habitat for mountain plovers, and the species is not expected to forage within the fenced areas of the site. The effects from loss of potential winter foraging habitat would be reduced through implementation of measures described in Table 2-9 and summarized at the end of Section 3.10.

While suitable breeding habitat does not exist at the Project Site, bald eagles are known to periodically forage within the Carrizo Plain region, primarily during the winter months. The Project Site is low quality foraging habitat for bald eagles. The change of use on up to approximately 4,100 acres of farming and grazing land would have a negligible effect.

Merlin, ferruginous hawk, northern harrier, Oregon vesper sparrow, tri-colored blackbird, and long-billed curlew are special status species that winter in the Carrizo Plain and were detected foraging within the Project Site. Ferruginous hawks, northern harriers, and long-billed curlews prefer open habitat with short vegetation and are not expected to forage within the completed facility. Vesper sparrows, which prefer open habitats with scattered shrubs, may find limited suitable wintering habitat within the facility boundaries. The Proposed Project would result in a net loss of wintering habitat for these species. As there is a large amount of remaining habitat in the region, displacement of wintering special status bird species would be a minor adverse impact.

Effects on Special Status Small Mammal Species. Current farming practices of tilling and poisoning are detrimental to most small mammal populations within the Project Site. Tulare grasshopper mouse and McKittrick pocket mouse persist in marginal areas of grassland habitat adjacent to open non-farmed areas. Conversion of croplands within the Project Site to a passive solar facility could increase the habitat quality for special status small mammals, resulting in a beneficial effect on these species.

Operation of the Proposed Project could permanently displace American badgers on up to 4,100 acres. Displacement of badgers from the Project Site would be mitigated along with kit fox mitigation land acquisition.

Alternative A would have long-term effects on special status species and habitats within Study Area A. However, measures would be implemented to prevent and reduce impacts on special status species. As a result, the Project would be unlikely to violate applicable laws, guidance, or regulations, take federally protected species, or substantially affect the quality or quantity of habitat for special status species.

<u>Decommissioning</u>. Impacts on special status species from decommissioning would be similar to those described for construction, as there would be ground disturbance and an increase in vehicles and personnel on-site during that time. Long-term effects from decommissioning could be beneficial or adverse, depending upon future uses of the Project Site.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Unless indicated below, impacts on special status species under Alternative B would be similar to those described for Alternative A.

Construction. Alternative B would impact fewer special status plant species, since only four species were detected within Study Area B. However, while different wildlife species were observed in Study Areas A and B, suitable habitat is present throughout the Project Site for many of the same special status wildlife species. As such, impacts on special status wildlife species in Study Area B would be similar to those described for Study Area A.

Impacts on special status plants with the potential to occur in Study Area B are presented in **Table 3-20**, Potential Impacts on Sensitive Status Plants Associated with Alternative B.

Operation. Alternative B could permanently convert an estimated 2,852 acres of cropland habitat within the fenced area to annual grassland habitat that would be potentially suitable for special status plant establishment.

Alternative B would potentially affect two burrowing owl nesting territories occupied in 2010. Other impacts on burrowing owl would be similar to those described for Alternative A.

Decommissioning. Impacts on special status species from decommissioning the Proposed Project within Study Area B would be similar to those described for Alternative A.

Reconductoring

Impacts from the PG&E Reconductoring Project are expected to be temporary and would be related to construction noise, human presence, driving vehicles off-road, hand removal of vegetation, and use of helicopters. Since reconductoring would occur over a long span (35 miles), there is the potential to affect species over a larger area. PG&E will use the blueprint provisions listed in their San Joaquin Valley Operations and Maintenance Multi-Species Habitat Conservation Plan (HCP) (PG&E 2006) to develop avoidance measures for the PG&E Reconductoring Project.

Reconductoring of the PG&E transmission line would result in temporary loss of grassland habitat and loss of foraging habitat for wildlife, and could result in disturbance to wildlife. In addition, reconductoring could result in disturbance to or loss of numerous special status species or their habitat, including blunt-nosed leopard lizard, San Joaquin whipsnake, coast horned lizard, burrowing owl, Swainson's hawk, white-tailed kite, Nelson's antelope squirrel, San Joaquin kit fox, giant kangaroo rat, Tipton kangaroo rat, Tulare grasshopper mouse, and American badger. The project could potentially impact special status species bird nests. Construction could result in the loss of special status plant species and the spread of noxious weeds.

TABLE 3-20
POTENTIAL IMPACTS ON SENSITIVE STATUS PLANTS ASSOCIATED WITH ALTERNATIVE B

COMMON NAME *SCIENTIFIC NAME* LISTING STATUS	TEMPORARY IMPACT	PERMANENT IMPACT	OVERALL EFFECT OF PROJECT[1]
Salinas milk-vetch *Astragalus macrodon* CNPS List 4.3	**None** All plants would be avoided during construction	**None** Project facilities would not be located in occurrence areas	• High potential for expansion of existing on-site population
Ferris' Goldfields *Lasthenia ferrisiae* CNPS List 4.2	Up to 2 plants could be affected during construction (50% of surveyed population in 2010)	**None** Substantial permanent occurrence areas are not present	• Suitable conditions would be present within the Project Site for periodic and possibly permanent establishment
Munz's tidy-tips *Layia munzii* CNPS List 1B.1	Up to 12 plants could be affected during construction (2% of surveyed population in 2010)	**None** Substantial permanent occurrence areas are not present	• Sections 27 and 28 could support a permanent population after Project construction
Paso Robles navarretia *Navarretia jaredii* CNPS List 4.3	Up to 1,000 plants could be affected during construction (35% of surveyed population in 2010)	**None** Impacted occurrences are expected to become re-established after construction	• High potential for expansion of existing on-site population

[1]All areas within Project fencing, roads outside of fences, monitoring and maintenance facility, substation, and switching station. Acreages listed are for a 4,100-acre Project; the area of permanent impact would be less under a reduced-acreage development scenario.

Source: Althouse and Meade 2010b

PG&E would implement general biological resource measures, species-specific measures, and avoidance and mitigation measures from the HCP to reduce the impacts on biological resources. In addition, mitigation would be included where applicable to further reduce impacts on special status plant and animal species, including compensation for impacts on giant kangaroo rat, San Joaquin kit fox, and Nelson's antelope squirrel.

Environmental Protection Measures for Topaz Solar Farm Project

The following measures have been incorporated into the Proposed Action to reduce impacts on special status species:

- General Special Status Wildlife:
  - Management practices would avoid the use of rodenticides.
  - Pets would not be allowed on the Project Site.
  - All exterior lighting would be placed or shielded to avoid lighting open space and PV array areas. No permanent night lighting would be allowed, except for the Project's Solar Energy Learning Center, substation, switching station, and monitoring and maintenance facility.
  - Scheduled construction traffic would be limited to daylight hours, within one-half hour of sunset or sunrise. On-site speed limits of 25 mph or lower would be strictly enforced.
  - Construction of PV arrays and fences within estimated 100-year flood boundaries would be minimized to create wildlife movement corridors through the facility. In addition to removing existing fencing within PV array areas, cross-fencing and wildlife wire fencing would be removed from movement corridors outside the Project's PV array fencing to promote wildlife passage through the Project Site.
  - During the construction phases, all food-related trash items such as wrappers, cans, bottles, and food scraps would be disposed of only in closed containers. These containers would be regularly removed from the Project Site.
- Fairy Shrimp:
  - Known and probable locations of federally listed fairy shrimp pools would be avoided and a permanent 250-foot radius setback would be implemented to protect these vernal pools.
  - If protocol-level surveys determine pools labeled as potential habitat do not contain listed vernal pool branchiopods, the 250-foot buffer can be reduced to the standard setback identified in Chapter 2 for the specific type

of pool (e.g., vernal pools would have 50-foot setbacks if no listed species are present, ephemeral wetland depressions would have 25-foot setbacks).

- Vernal pools would be protected during construction by installation of orange fencing placed at the setback boundary between the vernal pool and Proposed Project construction areas.
- Natural drainage patterns would be preserved.
- Prior to, during, and after the construction phase, use of pesticides or herbicides by the applicant would be in compliance with all local, state, and federal regulations.

- Bald and Golden Eagle:
  - Overhead collection lines and towers would be designed to be avian-safe by implementing the following measures recommended by the Avian Power Line Interaction Committee (APLIC 2006), as applicable and feasible. These avian-safe features may include the following:
    - Provide adequate separation between electrified components to protect the species involved;
    - Cover energized parts and/or cover grounded parts with materials appropriate for providing incidental contact protection to birds;
    - Apply perch management techniques; and/or
    - Install avian flight diverters on power lines.

- Mountain Plover:
  - Mountain plover presence or absence in construction areas would be determined by pre-construction surveys conducted in grassland habitat not previously disturbed by Project activities. Pre-construction surveys would be conducted concurrently with other sensitive species surveys.

- Special Status Small Mammals:
  - A biological monitor would be present during construction activities in all areas identified as potential habitat for special status species that have not previously been disturbed by construction. The monitor would be qualified to capture and relocate any special status mammal species that are found during construction. The monitor would have the authority to stop work, if special status species are

encountered, for any duration necessary to capture and relocate the animals.

- Prepare and implement a Habitat Mitigation and Monitoring Plan (HMMP). To ensure the success of on-site preserved land and acquired mitigation lands required for compensation of permanent impacts on vegetative communities and listed or special status species, the Project Proponent would retain a qualified biologist to prepare a HMMP. The County would specify requirements for the HMMP. In general, the plan would include a summary of habitat impacts, description of on- and off-site lands that would be preserved, monitoring requirements, on-site habitat and grazing management measures, and adaptive management measures.

- Special Status Plants:
  - The County may require pre-construction surveys, avoidance measures, and/or compensatory mitigation to reduce the likelihood for impacts.

- Special Status Reptiles and Amphibians:
  - The County may require pre-construction surveys and/or avoidance measures to reduce potential direct adverse effects on special status reptiles and amphibians.
  - Special Status Birds–Lark Sparrow, Grasshopper Sparrow, Loggerhead Shrike
  - Perform surveys for nesting birds one week prior to ground disturbance activities (as described in Section 3.9, Wildlife). If nests of these special status species are identified in the work area, the following measures would be implemented:
    - Occupied nests of special status bird species would be mapped using GPS or survey equipment. Work would not be allowed within a 100-foot buffer while the nest is in use. The buffer zone would be delineated on the ground with orange construction fencing where it overlaps work areas.
    - Occupied nests of special status bird species that are within 100 feet of Project work areas would be monitored at least every two weeks through the nesting season to document nest success and check for Project compliance with buffer zones. Once nests are deemed inactive and/or chicks have

fledged and are no longer dependent on the nest, work may commence.

- Burrowing Owl:
  - Pre-construction surveys for burrowing owls would be conducted not more than 30 days prior to any work that affects previously undisturbed grassland habitat containing burrows. The pre-construction surveys would be conducted in a manner sufficient to determine no burrowing owls are present in the work areas, including a 250-foot buffer surrounding the work areas. Pre-construction surveys would be conducted throughout the year when work is proposed, to account for breeding, wintering, and transient owls. If burrowing owls are present in the work areas during the breeding season (February 1 through August 31), the burrows would be avoided and protected from impacts. Mitigation and protection procedures would incorporate recommendations outlined in the burrowing owl protocol survey guidelines (California Burrowing Owl Consortium 1993). If burrowing owls are present during the non-breeding season, a passive relocation effort may be instituted.

- American Badger:
  - A pre-construction survey would be conducted within 30 days of beginning construction work on a portion of the Project Site to identify if badgers are present within the Project Site. The results of the survey would be sent to the Project manager and the lead agency.
  - If the pre-construction survey finds potential badger dens, they would be inspected to determine whether they are occupied. The survey would cover all Project areas included in the respective construction phase and would examine both old and new dens. If potential badger dens are too long to completely inspect from the entrance, a fiber optic scope would be used to examine the den to the end. Inactive dens may be excavated by hand with a shovel to prevent re-use of dens during construction. If badgers are found in dens between February and July, nursing young may be present. To avoid disturbance and the possibility of direct mortality or injury of adults and nursing young, and to prevent badgers from becoming trapped in burrows during construction activity, no grading would occur within 100 feet of active badger dens between February 1 and July 1.

  - Between July 1 and February 1 all potential badger dens would be inspected to determine if badgers are present. During the winter, badgers do not truly hibernate but are inactive and asleep in their dens for several days at a time. Because they are torpid during the winter, they are vulnerable to disturbances that may collapse their dens before they rouse and emerge. Therefore, surveys would be conducted for badger dens throughout the year. If badger dens are found on the Project Site during the pre-construction survey and are not raising young, a qualified biologist may encourage badgers to vacate the den. If measures such as partially blocking den entrances do not result in the badger moving, badgers may be live-trapped and moved to safe locations.

- San Joaquin kit fox:
  - A three-stage survey protocol and protection program would be utilized to prevent injury or death of kit fox during Project construction. Pre-construction surveys would include den location surveys, work area clearance surveys, and daily work area surveys conducted by an approved biologist. During construction, the survey and monitoring measures would be conducted specific to the Project that meet the standard San Joaquin kit fox CEQA mitigation measures approved by the County of San Luis Obispo, the USFWS, and CDFG for projects in San Luis Obispo County.
  - On-site habitat enhancements, including establishment and maintenance of natural vegetation and artificial dens, would be implemented with the goal of providing accessible and appropriate habitat attractive to kit fox. Enhancements utilized would be based on successful enhancement programs currently in place in other communities and habitat areas. Project fencing would include kit fox passages every 100 yards that exclude coyotes (kit fox predators) and large animals. Existing cross fencing would be removed, and no new interior fencing would be constructed. Artificial dens capable of supporting kit fox pairs and pups would be installed at a rate of one two-entrance pupping den and at least four escape dens in every section (or square mile) of the Project. Escape dens would be located both inside and outside Project fences. Artificial den placement would be more than 25 feet from any Project components to avoid potential conflicts.

- All excavations, steep-walled holes and trenches in excess of two feet in depth would be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Trenches would also be inspected for entrapped kit fox each morning prior to onset of field activities and immediately prior to covering with plywood at the end of each working day. Any kit fox found shall be allowed to escape before field activities resume, or be removed from the trench or hold by a qualified biologist and allowed to escape unimpeded.
- During Project construction phases, any pipes, culverts, or similar structures with a diameter of four inches or greater, stored overnight at the Project Site would be thoroughly inspected for trapped San Joaquin kit foxes before the subject pipe is subsequently buried, capped, or otherwise used or moved in any way.
- Construction activities would be adjusted to avoid active kit fox dens.
- PV arrays would be mounted on steel posts with the lower edge of modules at least 18 inches above the ground to allow kit foxes to see under the arrays.

A detailed description of mitigation measures for San Joaquin kit fox is presented in the San Joaquin Kit Fox Mitigation and Monitoring Plan (included in Appendix E). The mitigation and monitoring plan was prepared in association with the biological assessment to provide information and recommendations regarding assessment of Project impacts on San Joaquin kit fox. The plan describes site enhancement and design features to protect kit fox, as well as mitigation measures to fully compensate for impacts on the species.

In addition to measures described above, the following is a summary of site enhancement and mitigation measures that would be implemented to reduce impacts on San Joaquin kit fox.

- Compensate for permanent impacts on San Joaquin kit fox habitat. Off-site lands would be restored to annual grassland or maintained as annual grassland and be included in a conservation easement, protected in perpetuity, and managed to promote kit fox and other native species. This would be achieved either through a fee purchase or dedication with a conservation easement, along with Enhancement and Endowment Funds. Compensation for impacts on San Joaquin kit fox would include the acquisition of land at tiered ratios depending on the habitat type affected. A 1:1 ratio would be required for impacts on

cropland within fences, 4:1 ratio for impacts on grassland within fences, and 2:1 ratio for cropland within fences near natal dens. This could result in the acquisition of 7,298 acres under Alternative A and 9,802 acres under Alternative B, depending on the final Project configuration's fenced area.

- Off-site lands adjacent to the fenced PV array and Project infrastructure would be left as open space immediately available for use by the kit fox and other plant and animal species. These spaces would be enrolled in a conservation easement to protect the land in perpetuity. If feasible, the properties used for the Project may be placed in a permanent conservation easement upon Project decommissioning.
- A monitoring program would be implemented to determine if kit fox take up residence and re-establish use of the Project Site at levels equivalent to or better than existing use.
- The Project Site would be made available for research projects approved by the USFWS if approved by the Applicant in advance and accompanied by necessary protections and indemnities.
- Worker education programs regarding kit fox identification, life history and habits, population status, protection measures, and penalties for unauthorized take of San Joaquin kit fox would be provided for all construction and operational employees.
- Public education material would be provided to all guests and visitors. Signage would be placed at the Solar Energy Learning Center and the Monitoring and Maintenance building to provide education regarding kit fox and other rare species.

No Action Alternative

Under the no action alternative, there would be no new impacts on special status species. Ongoing impacts from land use practices such as ranching and farming would continue.

3.11 CULTURAL RESOURCES AND TRIBAL CONSULTATION

3.11.1 Affected Environment

This section provides an overview of the laws, regulations, and policies that influence the management of cultural resources, cultural resource conditions on the Project Site and in the surrounding area, and tribal consultation efforts related to the Proposed Project.

Regulatory Framework

National Historic Preservation Act

The National Historic Preservation Act of 1966 (NHPA) addresses preservation of historic properties, including historical and archaeological districts, sites, buildings, structures, and objects that are eligible for listing on the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official, the State Office of Historic Preservation (OHP), and Indian tribes. The goal of consultation is to identify historic properties potentially affected by the federal undertaking, assess effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties. Determining any property's NRHP eligibility follows a criteria-driven evaluation procedure specified at 36 CFR Part 60.

The significance of an historic property is determined by it being at least 50 years old (unless it is "exceptionally significant"), its context (e.g., its place in American history, architecture, archaeology, engineering, and culture), its integrity of location, design, setting, materials, workmanship, feeling and association, and its meeting one or more of the following four criteria:

A. Association with events that have made a significant contribution to the broad patterns of history;

B. Association with the lives of persons significant in the past;

C. Embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction; or

D. Has yielded, or may be likely to yield, information important in prehistory or history.

A property may be eligible for the NRHP because of its historical importance to a tribe, including traditional religious and cultural importance. A 1992 amendment to the act (PL 102-575) explicitly directs that properties of traditional religious and cultural importance to an Indian tribe may be determined to be eligible for inclusion on the NRHP, and that in carrying out its responsibilities under Section 106, a federal agency would consult with any Indian tribe that attaches religious and cultural significance to such properties.

The Proposed Action is an undertaking, as defined by 36 CFR, 800.3, and is subject to Section 106 and consideration under other federal requirements. DOE will initiate Section 106 consultation prior to publication of the Draft EIS.

Archaeological Resources Protection Act

The Archaeological Resources Protection Act of 1979 (16 USC 470) provides for the protection and management of archaeological resources and sites on public lands and Indian lands, and specifically requires notification of the affected Indian tribe if archaeological investigations on public lands or Indian lands would result in harm to or destruction of any location considered by the tribe to have religious or cultural importance.

Native American Graves Protection and Repatriation Act

Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) established that lineal descendants, tribes, and Native Hawaiian organizations have rights of ownership to cultural items, defined as human remains, funerary objects, sacred objects, and objects of cultural patrimony, taken from federal and Indian lands. It requires consultation with appropriate Indian tribes prior to the intentional excavation or removal after inadvertent discovery of cultural items, including human remains and objects of cultural patrimony.

State of California Code

Administrative Code, Title 14, Section 4307 requires that no person would remove, injure, deface or destroy any object of paleontological, archaeological, or historical interest or value.

Health and Safety Code, Section 7050.5, requires that construction or excavation be stopped near human remains until a coroner determines whether the remains are Native American; requires the coroner to contact the Native American Heritage Commission if the remains are Native American. Section 7052 establishes that disturbance of Indian cemeteries is a felony.

Health and Safety Code, Section 7051, addresses the removal of human remains from internment and requires a place of storage while awaiting internment or cremation. Intent to sell or to dissect them with malice or wantonness is a public offense punishable by imprisonment in a state prison.

Penal Code, Title 14, Sections 622.5 and 623, establish that it is a misdemeanor offense for any person other than the owner to willfully damage or destroy archaeological or historical features on public or privately owned land.

Public Resources Code, Sections 5097.9 to 5097.991, establish regulations for the protection of Native American religious places, establish the Native American Heritage Commission, establish repatriation of Native American artifacts, and require notification of discovery of Native American human remains to the most likely descendant.

Public Resources Code 5024 and 5025, which create the OHP and the State Historical Resources Commission, and establish the California Register of Historical Resources (CRHR).

General Project Area

Cultural Overview

Applied Earthworks has prepared a cultural overview of the Project Site and surrounding area, documented in the Cultural and Paleontological Resources Investigations for the Proposed Topaz Solar Farm, California Valley, San Luis Obispo County (Lichtenstein et al. 2010). This overview, which describes the prehistoric and historical context of the project area and documents cultural inventories and findings for the Project Site, is reproduced below.

Prehistoric Context

Paleo-Indian/Early Holocene (Prior to 6500 BC). The Paleo-Indian Period represents the earliest human occupations in the region, which began prior to 10,000 years ago. Artifacts representative of this period include fluted, Clovis-like projectile points, crescents, large bifaces used as tools as well as flake cores, and a distinctive assemblage of small flake tools. There is a noted lack of ground stone during this period, suggesting dependence on faunal over floral resources. However, recent investigations of early sites in the interior and the coast suggest that milling technology may have appeared earlier than had been assumed previously and played a larger role in Paleo-Indian subsistence (Fitzgerald 2000; Jones et al. 2008). Clovis-like fluted projectile points (likely dating between 13,500 and 11,000 years ago) have been found in interior San Luis Obispo County, including one such point discovered at CA-SLO-1942 on Santa Margarita Ranch (Gibson 1995).

Population density was quite low during this time, and the small social groups probably were highly mobile; combined with erosion, sedimentation, and other natural factors, this explains why very few Paleo-Indian sites have been identified (Colten 1997). Arguably the oldest known residential site in San Luis Obispo County, CA-SLO-1797 (the Cross Creek Site), is located 14.4 miles inland and was first occupied around 10,000 years ago (Fitzgerald 2000). Evidence of concurrent occupation around the pluvial lakes of the central valley is found in the lowest levels of CA-KER-116 near Buena Vista Lake (Hartzell 1992) and possibly at CA-SLO-2 along the coast (Greenwood 1972). By that time it appears that related, interdependent coastal and interior populations were developing distinctive land use and subsistence strategies suited to the varying inland and coastal environments (Jones et al. 2008).

Milling Stone Period (6500–3500 BC). The Milling Stone Period is defined by the prevalence of handstones and milling slabs in archaeological sites, indicating a reliance on seeds and other plant foods. Well-developed middens also have been associated with this period, suggesting more regular and continuous use of habitation sites (Breschini et al. 1983). Flaked stone artifacts include leaf-shaped bifaces, oval bifacial knives, choppers, and scrapers.

During this period people subsisted on a mixture of plant foods, shellfish, and a limited array of vertebrate species (Erlandson 1994). However, researchers working in other locations (Erlandson 1988, 1991; Glassow 1992; Jones et al 1989:189; Wallace 1978) have reported differently on food preferences during the Milling Stone Period, which may reflect mobility between coastal and inland locations (Jones et al. 1994). While coastal sites like CA-SLO-585 in Diablo Canyon (Greenwood 1972), CA-SLO-165 at Morro Bay (Jones et al. 1994), and CA-SLO-1797 at Cross Creek (Fitzgerald 2000) show occupation during this time, a marked hiatus in occupation was noted in the Buena Vista Lake area (Hartzell 1992).

Early Period (3500–600 BC). Cultural changes during the Early Period are thought to have occurred as a result of environmental shifts, rising sea levels, and an increase in the population base. The response to these changes by people of this period is evidenced by sites that appear more settled, but not permanent, with an increase in specialized sites for resource procurement activities such as hunting, fishing, and plant material processing (Jones et al. 1994:62; Jones and Waugh 1995:132). As a result of increased population, trade between regions expanded, as evidenced by the presence of exotic shell beads and obsidian materials and an increase in site density along the coast, on the Santa Margarita Ranch, and in the western and southern San Joaquin Valley (Flint et al. 2000; Hartzell 1992; Jones et al. 1994). Like the Milling Stone Period, ground stone artifacts identified with the Early Period consist of handstones and milling slabs. Toward the end of the period mortars and pestles were added, probably indicating the first systematic dietary use of acorns (Glassow 1996).

Middle Period (500 BC–AD 1000). The Middle Period is defined by the continued specialization in resource exploitation and increased technological and economic complexity in all regions. Acorns become well established as the main dietary staple, supplemented by fish along the coast and small and large game in the interior. During this period there is evidence of greater use of seasonal resources, the first attempts at food storage, and introduction of the bow and arrow (Glassow and Wilcoxon 1988; King 1990).

Middle Period artifact assemblages include shell fishhooks, Olivella beads, and contracting stem projectile points. Although changes in ornaments and other artifacts suggest an increase in social complexity (King 1990), such complexity probably did not reach the levels attained in later prehistory (Arnold 1992; Jones and Waugh 1995). Continuation and expansion of trade is evident in the increased quantity and diversity of obsidian items and beads associated with this period. Like the Early Period, sites were occupied on a regular basis but not as permanent settlements. These habitation bases functioned in conjunction with smaller short-term locales as specialized resource processing areas.

Late Period (AD 1000–1500). The Late Period is a time of developing political and social complexity. Large permanent villages are well established in coastal areas

with temporary campsites for specialized resource procurement. Villages in the interior appear to have been smaller, and settlement patterns may have varied from those along the coast.

By the Late Period, the Chumash culture was probably very similar to what the Spanish observed when they arrived. The southern Chumash had developed a complex religious, social, and economic system. There are few records of Spanish encounters with the Chumash north of Point Conception (Glassow 1990), with the exception of the 1769 Portolá expedition that made contact with the native inhabitants at Avila Beach (Jones et al. 2007:129). Social and political structures continued to increase in complexity. Archaeological investigations indicate an increase in marine and terrestrial species and the change from residential sites to temporary camp use. Artifact assemblages from the Late Period contain arrow points, small bead drills, bedrock mortars, hopper mortars, Olivella beads, and steatite disk beads (Jones et al. 2007; Price 2005).

Historical Context. The remoteness and dry climate of the Carrizo Plain have been the primary factors shaping its history. In 1772, Mission San Luis Obispo de Tolosa was established as the fifth in what became a chain of 21 Spanish missions along the California coast. Driving cattle from the mission would have meant traveling a circuitous route through the Santa Lucia and La Panza ranges to reach the northern part of the plains—a considerably greater distance than the 35 to 40 air miles that separates San Luis Obispo from California Valley. After gaining independence from Spain in 1821, Mexico declared a series of acts that changed the settlement and land use patterns of its Alta California territory. The Colonization Act of 1824 and the Supplemental Regulations of 1828 afforded private individuals—both Mexican nationals and immigrants—the right to obtain title to land, while the Secularization Act of 1833 officially ended the mission's monopoly of prime California lands (Hackel 1998:132–134). From the mid-1830s to the end of Mexican rule, California governors issued about 800 land grants across the province (Monroy 1998:180).

Following the Treaty of Guadalupe-Hidalgo in 1848, which ended the Mexican-American War and ceded Alta California to the US, California became the thirty-first state in the Union in 1850. Five years later, the Government Land Office began its survey of the Carrizo Plain with the purpose of opening the area to settlement. Before the land was made available to the public in 1856, a substantial portion of the region was withdrawn from sale and placed in the hands of the Atlantic and Pacific Railroad (Eichel 1971:15). Most of the remaining land was quickly swept up by Bay Area land speculators and large cattle interests.

In 1885, California released the railroad indemnity lands on the Carrizo Plain, making them available for public sale (Bastian and Roland 2008:4.3-13; Eichel 1971:18–21). The availability of land attracted a small number of settlers who

took up 160-acre homesteads along the low hills on the northeast margin of the plain under the auspices of the Immigration Association of California. The homesteaders grew grain and raised livestock, but the isolation of the region, the lack of a consistent water source, and their relatively small land holdings weighed heavily against their efforts for long-term success. With no towns or urban development of any kind on the plains, the nearest accessible market center was San Luis Obispo. Although the road between Pozo and La Panza (over the mountains) was graded in 1884, the journey to San Luis Obispo to purchase supplies involved a two-day round trip and was undertaken only twice per year (Eichel 1971:21).

Drought struck the plain in the 1890s, and the region's chronic scarcity of water became so acute that the homesteaders were forced to abandon their farms. By contrast, although the large cattle operations were obligated to move their herds to greener ranges, they endured relatively far less financial hardship and remained the primary economic force on the plain.

Nevertheless, the influx of early settlers after 1885 did result in the first infrastructural, social, and commercial developments on the plain. A county road was built over the Temblor Range connecting the Carrizo Plain with McKittrick in west Kern County (Eichel 1971:20–23). This route was the precursor to Highway 178 and later Highway 58. The Simmler School District was formed in 1887, and mail service to the plain began one year later.

In the early twentieth century a fundamental change occurred in the agricultural economy of the Carrizo Plain that substantially altered land use, settlement patterns, and the natural landscape. While raising cattle remained a part of the economy, particularly in the southern Carrizo Plain, dry-land wheat farming became the dominant form of agriculture in the northern plain from the 1900s through the 1960s.

As early as the 1880s, farmers on the Carrizo Plain began to turn to wheat production. But it was not until the early twentieth century that the impediments of difficult transportation and unmechanized labor were overcome sufficiently to allow wheat growing on a commercial scale. The Southern Pacific arrived in McKittrick in 1908, greatly improving access to larger markets for California Valley farmers (Eichel 1971:30). Probably the single most important factor in shifting the local economy to wheat growing was the development of the mechanized tractor, which made possible the cultivation of large acreage with a small expenditure of labor. Expensive to purchase, these machines could only be used economically on farms of 5,000 acres or more. The introduction of heavy-duty trucks by 1930 further facilitated transportation of the harvested wheat to market.

From the early twentieth century until the 1960s, Carrizo Plain agriculture was based on the production of hard wheat. In 1933, the plain produced

approximately 30,000 acres of wheat, and the acreage nearly doubled during World War II (Eichel 1971:32). Ranching was marginalized; cattle grazed in upland areas on either side of the basin and on the wheat stubble in the valley after harvests. The change from subsistence farming and cattle ranching to commercial, one-crop farming not only changed the economy of the Carrizo Plain but also had a profound impact on land use, settlement patterns, and land ownership.

Land belonging to small operators and homesteaders was absorbed by larger owners, so that during the 1920s and 1930s the average farm on the Carrizo Plain was approximately 6,000 acres (Eichel 1971:35). Farmsteads were widely separated and had a distinctive character. Usually they were composed of a primary residence, a well and pump house, storage sheds, gasoline tank and pump, a machine/blacksmith shop, and one or more smaller houses and/or bunk houses. In addition to these common rural buildings and structures, the farmsteads included specialized structures for the processing and storage of wheat. Among the most distinctive were the bulk tanks, often conical in shape, used for storing harvested wheat prior to loading it onto trucks that would take it to the railhead in McKittrick. Conveyor belts and raised platforms for moving wheat crops were also frequently found on these farms. Ornamental trees were planted around the farmsteads on the formerly treeless plain. Fencing was introduced to prevent cattle from foraging in the wheat fields until after harvest. In many cases, corrals and loading chutes for cattle were also present, indicating that the farms continued to raise cattle as a secondary economic activity.

These changes in the physical landscape of the Carrizo Plain were more marked in the north than in the south. The southern plain remained in highly concentrated ownership and was not marked by the emergence of "operator" farmsteads to nearly the degree as in the northern plain.

Consolidated ownership also led to less fencing to separate properties and manage wheat fields. Cattle continued to play a significant role in the total agricultural operations (Eichel 1971:39; Supernowicz 1991:13–14).

In the 1960s, the federal government introduced agricultural programs that established a national wheat acreage allotment, limiting the amount of wheat a single farmer could produce. The profitability of wheat farming in the plain had always depended on large-scale production, so the government-imposed limits had a drastic effect on Carrizo Plain wheat farmers. Moreover, the soil, temperature extremes, limited rainfall, and lack of irrigation resources in the Carrizo Plain did not afford them the option of turning readily to other crops. While barley and alfalfa continue to be grown, much of the land has been allowed to revert to grazing (Eichel 1971:45). By the 1970s the amount of land left fallow in the plain had risen significantly, and, although wheat farming continues on a small scale, the distinctive dry-farming economy and land-use patterns that it fostered are disappearing.

Ethnography. The Project Site lies in a region that was likely part of the traditional ethnographic territory of the Interior Chumash, or Cuyama, although the northern end of the Project Site was likely within the southern range of the Migueleño Salinans. Grant (1978) noted that very little is known about the tribes of this region because ethnographic information is almost nonexistent, few systematic archaeological investigations have been carried out in the region, and the territory is far from the mission lands, so no vital statistics were recorded. Nonetheless, "this is the area that has provided the finest of the Chumash rock paintings" (Grant 1978:530). The meager information suggests that the Cuyama occupied about a dozen small settlements, most of which were in the well-watered Cuyama Valley, south of the Project Site on the opposite side of the Caliente Range. Since the current project area has little surface water and is otherwise limited in its resources, it was less attractive for long-term settlement. However, the herds of antelope and tule elk plus a spring seed crop would have made the area attractive for short-term resource procurement forays.

The Southern Valley Yokuts were likely only occasional visitors to the area; their traditional homeland was on the east side of the Temblor Range in the southern San Joaquin Valley. The Tulare Lake and Buena Vista Lake basins offered a rich and varied array of resources to the several Yokuts tribes occupying its environs. These tribes, referred collectively as the Lake People by Latta, include the Apichi, Nutunutu, Tache, Halaumne, Chunut, Wowol, Tulumne, Tuhoumne, and Yowlumne (Latta 1977:248). In prehistoric times and even as late as the 1880s, the lake lay only about 40 miles from the Project Site. Most Yokuts villages were located east of the lakes, although the Tache and Wowol occupied the shores of Tulare Lake, as did the Tulumne around the shores of Buena Vista Lake.

The Carrizo Plain is well known for the spectacular polychrome pictographs at CA-SLO-79 and other nearby sites about 10 miles south of the Project Site. These complex and elaborate paintings feature abstract designs executed principally in red, black, white, and yellow, and represent the zenith of the Chumash rock painting style (Grant 1965, 1978).

Cultural Resource Inventories

Class I Survey. In April 2009, a record search was requested by Applied Earthworks, Inc. from the Central Coast Information Center of the California Historical Resources Information System, housed on the campus of the University of California, Santa Barbara. The records search encompassed the 5,490 acres of the proposed Project Site plus a buffer of 0.5 mile surrounding the Project Site. In December 2009, a supplemental records search was performed after an additional 3,800 acres were added to the southern end of the Project Site. Information Center staff examined site records, site location base maps, and other materials on file to identify previously recorded cultural resources and prior surveys within the Project Site, as well as within a 0.5-mile

radius surrounding the Project Site (Lichtenstein et al. 2010). A Class I survey of the remainder of the site was completed in August 2010 (Haydu 2010).

The Central Coast Information Center reported that no prehistoric or historical archaeological sites had been recorded previously within the Project Site, or within a 0.5-mile radius of the Project boundaries. Moreover, no resources are listed on the NRHP or the California Register of Historical Resources (CRHR) or as California Points of Historic Interest or State Historic Landmarks. The records search indicated two previous cultural resource surveys within the Project Site. Serena (1983) covered the entire 640 acres of Section 27, Township 29 South, Range 18 East, and found two prehistoric isolates—an obsidian biface and a chert flake. Sawyer (undated) surveyed 12 acres from the same section but encountered no resources. Both studies were associated with construction of the former ARCO Solar Plant that operated from 1984 to 1995.

In 2007, URS Corporation conducted cultural resources investigations for the Carrizo Energy Solar Farm proposed by Ausra CA, LLC (Farmer 2007). While the 960-acre project area of the Carrizo Energy Solar Farm lies in the center of the proposed Project Site, URS's study covered a much wider area that included other portions of the Project Site. Seven resources identified by Farmer for the Ausra investigation are located within the Project Site. None of the seven resources recorded on the Project Site by URS are eligible for inclusion in the National or California Registers (Farmer 2007).

Class III Survey. A pedestrian survey of the Project Site was conducted by Applied Earthworks, Inc. over three field sessions. From June 8 to June 27, 2009, surveyors covered 5,490 acres, mostly in the northern half of the Project Site. From December 14 to December 23, 2009, an additional 3,820 acres in the southern half of the Project Site were surveyed. From August 2 to August 7, 2010, an additional 819 acres adjacent to the northeastern corner of the original Project Site were surveyed. In total, the surveys encompassed 10,131 acres. Sites previously recorded by the Carrizo Energy Solar Farm Project's archaeological consultant were also reviewed.

Nineteen resources were discovered during the course of the field survey, including one prehistoric archaeological site, nine historical sites, and nine prehistoric isolates. In addition, the seven previously identified historic sites/features were revisited; information on these resources is summarized in **Table 3-21**, Class III Survey Results.

TABLE 3-21
CLASS III SURVEY RESULTS

SITE NUMBER	RESOURCE TYPE	DESCRIPTION	ESTIMATED TIME PERIOD	STUDY AREA IN WHICH SITE IS LOCATED[1]	IN PV DEVELOP-MENT AREA? [3]	NRHP DETERMINATION (PENDING SHPO CONCURRENCE) [4]
CA-SLO-2623	Lithic scatter	Seasonal campsite with flaked lithics and ground stone	Prehistoric	Outside Study Area A boundary[2]	No	Eligible
CA-SLO-2624H	Windmill/well site	Water well, windmill and water storage tank	Historic	A, B	Yes	Ineligible
CA-SLO-2625H	Livestock activity site	Livestock water trough	Historic	B	Yes	Ineligible
CA-SLO-2626H	Abandoned well	Water well, conveyance and storage equipment	Historic	A, B	Yes	Ineligible
CA-SLO-2627H	Well site	Water well, pumping equipment, water tanks and trough	Historic	B	Yes	Ineligible
CA-SLO-2628H	Farm equipment	Two aerators	Historic	A, B	Yes	Ineligible
CA-SLO-2629H	Watering station	Livestock watering trough and water storage tank	Historic	A, B	Yes	Ineligible
CA-SLO-2630H	Windmill/ well site	Water well, windmill, water storage tank and troughs	Historic	A	No	Ineligible
CA-SLO-2631H	Watering site	Water storage tank	Historic	A, B	Yes	Ineligible
40-041223	Polin Farm	Residence, outbuildings, chicken coop, windmill and grain storage units	Historic	A, B	Yes	Ineligible
--	Filos Property	Agricultural buildings	Historic	A, B	Yes	Ineligible
--	Filos Property II	Residence, outbuildings, sheds	Historic	Adjacent to Study Area A and B	No	Ineligible
--	King Property	Residence, silos, water tanks, sheds	Historic	A, B	Yes	Ineligible
--	Morro Bay to Midway Trans-mission Line	Galvanized steel lattice towers with electrical transmission lines	Historic	A, B	No	Ineligible
--	State Highway 58	Two lane paved rural highway that follows the general route of the historic wagon road	Historic	Adjacent to Study Area A and B boundaries	No	Ineligible

TABLE 3-21 *(continued)*
CLASS III SURVEY RESULTS

SITE NUMBER	RESOURCE TYPE	DESCRIPTION	ESTIMATED TIME PERIOD	STUDY AREA IN WHICH SITE IS LOCATED[1]	IN PV DEVELOP-MENT AREA?[3]	NRHP DETERMINATION (PENDING SHPO CONCURRENCE)[4]
--	Carrizo Plain Substation	Electrical transmission substation building	Historic	A, B	No	Ineligible
--	Cavanaugh Property	Residence, outbuildings	Historic	A	No	Ineligible
40-038244	Isolate artifact	Stone mortar fragment	Prehistoric	A	No	Ineligible
40-038245	Isolate artifact	Mano	Prehistoric	A	Yes	Ineligible
40-038246	Isolate artifact	Pestle	Prehistoric	A	No	Ineligible
40-038247	Isolate artifact	Metate fragments	Prehistoric	A	No	Ineligible
40-038248	Isolate artifact	Biface fragment	Prehistoric	Outside Study Area B boundary	No	Ineligible
40-038249	Isolate artifact	Chert flake	Prehistoric	A	Yes	Ineligible
40-038250	Isolate artifact	Bowl fragment	Prehistoric	A	Yes	Ineligible
AE-1939-ISO-8	Isolate artifact	Mano	Prehistoric	B	Yes	Ineligible
AE-1939-ISO-9	Isolate artifact	Mano	Prehistoric	A, B	Yes	Ineligible

[1] The survey areas encompassed a slightly larger footprint than is covered by the current Project Site boundaries. For this reason, some identified cultural sites are outside the Project Site boundaries.

[2] This one potentially eligible site was located at the edge of the Project Site boundary; the Project Proponent revised the boundary to avoid the site.

[3] The PV development area is shown in Figures 2-2 and 2-3.

[4] Descriptions of each site and evaluations of their eligibility are contained within Cultural and Paleontological Resources Investigations for the Proposed Topaz Solar Farm, California Valley, San Luis Obispo County (Lichtenstein et al. 2010).

The one prehistoric archaeological site (CA-SLO-2623) is a large, low-density prehistoric lithic scatter of flaked (flakes, bifaces, cores), battered (hammer stones, battered cobbles), and ground stone (metate, manos) artifacts. No features or temporally diagnostic artifacts were observed. The site is likely the remains of a small seasonal campsite. CA-SLO-2623 is considered potentially eligible for inclusion on the CRHP and is also assumed to be eligible for the NRHP.

The nine historic sites consist of pre-1955 farmstead/ranches associated with dry-wheat farming and/or cattle ranching (1890-1960) and historic isolates of farmstead/ranch operating equipment and watering sites. Applied Earthworks, Inc. completed formal significance evaluations of the nine historic ranching properties on the Project Site. These sites were found to lack significance and are recommended as not eligible for the National or California Registers.

By convention, the nine prehistoric isolates are not considered CRHP- or NRHP-eligible resources. No further study or management measures are necessary for the historical sites and isolates.

Study Area A

Cultural resource sites in and around Study Area A are identified in Table 3-21. The one prehistoric archaeological site (CA-SLO-2623) is located near the Study Area A boundary and is considered to be an eligible resource. As a general rule, avoidance of impacts is the preferred treatment alternative under NEPA and CEQA. As the site is located along the study area boundary, the Project Proponent revised the study area boundary to avoid this potentially eligible prehistoric archaeological site. No other potentially eligible resources were identified within Study Area A.

Study Area B

Cultural resource sites in and around Study Area B are identified in Table 3-21. No potentially eligible resources were identified within Study Area B.

Reconductoring

Cultural Resources

The PG&E Reconductoring Project falls into two geographic regions, the Central Coast region, as described for the Proposed Action, and the Central Valley, which includes the San Joaquin Valley.

Ethnography

The PG&E Reconductoring Project is within the territories of the Southern Valley Yokuts, the Interior Chumash, and the Salinan. Approximately 25 miles of the transmission line in Kern County are within Yokut territory, while the 10 miles of transmission line in San Luis Obispo County are within Chumash and Salinan territories.

The most significant ethnographic resources in the project area are the polychrome pictographs found within the Carrizo Plains National Monument, as described under the Proposed Project.

Cultural Surveys

ICF archaeologists surveyed the work areas, access roads, towers, and tension/pulls sites along the transmission line upgrades ROW from May 25 to May 27, 2010. One prehistoric isolated find was recorded during this survey. Surveys were not conducted at the microwave reflector site.

An additional cultural resources inventory identified 12 previously recorded cultural resources, as well as two new historic archaeological sites, two prehistoric archaeological sites, one historic isolate, and three prehistoric isolates along the reconductoring route.

An additional prehistoric site was discovered by archeologists from Ecology and Environment at one of the potential switching station sites, and work is being performed to define its boundaries.

Historical Landscape Study
Bastian and Roland (2008) evaluated the historical landscape of the California Valley and concluded that it did not qualify as a Rural Historic Landscape.

3.11.2 Environmental Impacts

Impacts on cultural resources occur when there is damage or loss of cultural resources or their settings. Under NEPA, impacts on cultural resources are assessed by applying the criteria of adverse effect as defined in the implementing regulations for Section 106 of the NHPA (36 CFR 800). "An adverse effect is found when an action may alter the characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, workmanship, feeling, or association. Adverse effects may include reasonably foreseeable effects caused by the action that may occur later in time, be farther removed in distance, or be cumulative" (36 CFR 800.5). Additionally, assessment of effects involving Native American or other traditional community, cultural, or religious practices, resources, or areas requires focused consultation with the affected group and impact analysis would be informed by said consultation.

For the purposes of this analysis, criteria for determining effects on cultural resources include the following:

- Cause physical destruction or damage to all or part of the property;
- Alter a property, by restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary of the Interior's standards for the treatment of historic properties (36 CFR 68) and applicable guidelines;
- Remove the property from its historic location;
- Change the character of the property's use or physical features within a property's setting that contribute to its historic significance (e.g., isolating the property from its setting);
- Introduce visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;

- Neglect a property, which 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
- Disturb any human remains, including those interred outside of formal cemeteries.

Any of the these indicators would contribute to an adverse effect under the NHPA to a cultural resource if it is listed on or eligible for listing on the NRHP or if it is area of importance to Native American or other traditional community. If a site is determined to be eligible for listing or is listed on the NRHP, any physical disturbance would also constitute a significant impact under NEPA. If a site is determined to be ineligible for listing, then any disturbance would not be significant under NEPA or "adverse" under NHPA.

Impacts can be direct or indirect in nature and are defined in the NEPA regulations at 40 CFR 1508.8. Direct effects are caused by the action and occur at the same time and place; indirect effects are caused by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable. Using the NEPA definition in conjunction with the Section 106 definition (as noted above, 36 CFR 800.5), the range of direct effects is narrowed while the range of indirect effects is broadened. In practice, a "direct effect" would be limited to the direct physical disturbance of a historic property such as destroying a historic property to construct a project. Indirect effects could include visual or audible intrusion as a result of the project being built or increased risk of looting as a result of better access and increased visitation to the area.

Impacts on cultural resources are typically considered permanent as these resources are finite and disturbance of them, particularly archaeological sites, cannot be reversed. However, impacts on the historic landscape or the viewsheds of historic or other culturally significant areas can be temporary if projects do not permanently impact associated resources and are removed at a future date.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Identified historic and prehistoric cultural properties within the boundary of Study Area A were shown on Table 3-21. Of the nineteen sites found within the study area boundary, eight historic sites and four prehistoric sites are in the potential fenced area (see Table 3-21). These sites would be directly impacted by construction activities, including being removed or destroyed. Because these resources are considered ineligible for listing on the state or federal registers, subject to concurrence by the SHPO, this would be a minor adverse impact.

There is the potential for undiscovered buried cultural resources and/or human remains to exist at the Project Site. Construction activities could disturb previously undiscovered cultural resources and/or human remains by exposing buried material during construction, resulting in inadvertent artifact destruction or loss of scientific context. Indirect impacts could result from the increased human presence from anticipated construction workers, leading to possible illicit collecting of newly exposed materials.

Measures such as the following should be implemented to reduce the potential for adversely impacting undiscovered culture resources or human remains:

- A plan should be prepared outlining the processes of notification, evaluation, and actions to be taken should unanticipated cultural resources be encountered during construction. These processes should include halting work immediately upon encountering a previously undiscovered resource, retaining a qualified archeologist to evaluate the resource for eligibility to the California or National Register, and notifying the appropriate agencies.
- Prior to construction, sensitivity training should be provided to all construction personnel outlining on-site avoidance requirements, procedures for reporting any sensitive resources that may be discovered, protocols to treat unexpected discoveries, and the importance of cultural resources to the Native American community; and
- In the event that human remains or possible human remains are encountered, work should cease immediately and the County Coroner should be notified. State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. If remains are determined to be prehistoric, the Coroner will notify the NAHC, which will determine and notify a Most Likely Descendent. With the permission of the landowner or the landowner's agent, the Most Likely Descendent may inspect the site of discovery within 48 hours of notification of the NAHC. The Most Likely Descendent may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burial.

Operation. Operation of the Topaz Solar Farm under Alternative A would have indirect impacts on the historic landscape setting of cultural resources by altering the landscape and degrading the viewshed. Additionally, Alternative A would create a landscape that is not in keeping with the historic nature and setting of the resources shown in Table 3-21. This impact would not be substantial.

Project operations would not be expected to encounter previously undiscovered resources due to the lack of surface-disturbing actions. However, if such discoveries are made, procedures described under construction should be followed to cease work, retain a qualified archeologist to evaluate the resource, and notify the proper agencies of the find.

Decommissioning. Decommissioning and removing components would eliminate the indirect viewshed or setting impacts for cultural resources.

Similar to construction impacts, the potential for encountering undiscovered buried cultural materials and/or human remains would exist during surface-disturbing decommissioning activities. Implemented measures similar to those described for construction would reduce the potential for adversely affecting previously undiscovered resources.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Identified historic and prehistoric cultural properties within the boundary of Study Area B were shown on Table 3-21. Of the fourteen sites found within the study area boundary, ten historic sites and two prehistoric sites are in the development area (see Table 3-21). These properties would be directly impacted by construction activities, including being removed or destroyed. Because these resources are considered ineligible for listing on the state or federal registers, subject to concurrence by the SHPO, this would be a minor adverse impact.

As with Alternative A, the potential for undiscovered buried cultural resources and/or human remains exists. Implementation of measure described under the Alternative A construction analysis would prevent destruction or loss of previously undiscovered cultural resources and would lessen the potential for disturbance of resources during construction activities.

Operation and Maintenance. Direct and indirect impacts would be the same as described under Alternative A.

Decommissioning. Direct and indirect impacts would be the same as described under Alternative A.

Reconductoring

Construction-related staging, traffic, and grading for reconductoring have the potential to damage sites of archaeological or cultural significance through crushing, trampling, or displacing materials. Similar to the risks associated with Alternatives A and B, the potential for undiscovered buried cultural resources and/or human remains exists despite previous archaeological surveys and investigations along the transmission line. Reconductoring activities could also directly impact undiscovered cultural resources and/or human remains by exposing buried material, resulting in inadvertent artifact destruction or loss of scientific context. Indirect impacts could result from the increased human

presence from on-site workers, leading to possible illicit collecting of newly exposed materials.

PG&E would implement measures to reduce the potential effects of reconductoring on cultural resources. These measures include avoiding known cultural sites, avoiding surface disturbance along potentially sensitive areas, implementing a worker sensitivity training program, and developing a monitoring and treatment plan for encountering undiscovered resources.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee for the Project. If DOE does not issue the loan guarantee, the Proposed Project would not be constructed, and therefore would not have any impacts on cultural resources or areas of Native American interest or concern.

3.11.3 Tribal Consultation and Outreach

Consultation and Issue Identification

As the federal lead agency for the proposed undertaking, DOE is responsible for initiating government-to-government consultation with federally-recognized Native American tribes per the laws, regulations, and policies noted in Section 3.11.1, above. Tribal consultation ensures that tribal rights and concerns are considered prior to DOE taking actions, making decisions, or implementing programs that may affect tribes. Consultation is necessary to identify issues of tribal concern, sacred sites and other places of traditional religious and cultural importance, and to incorporate appropriate mitigation measures in the event such sites are located during construction. Tribal consultation will continue throughout the NEPA and Section 106 compliance processes.

On October 26, 2010, DOE invited the Santa Ynez Band of Chumash Mission Indians of the Santa Ynez Reservation to enter into government-to-government consultation with the DOE in respect to the Proposed Project. The Santa Ynez Band of Chumash Mission Indians is the only federally recognized tribe in the immediate Topaz Solar Farm project area. This letter is included in Appendix F, Cultural Resources, Including Section 106 Consultation. On January 19, 2011, the Tribe contacted the DOE by phone and indicated that it had no concerns with the Proposed Project and that it was not necessary to enter into government-to-government consultation.

On December 28, 2010, DOE contacted the Native American Heritage Commission (NAHC) in Sacramento, California to request a search of its Sacred Lands Inventory file to determine if any Native American cultural resources had been recorded in the immediate study area and for a list of individuals and groups with knowledge regarding resources of sacred or special cultural and spiritual significance in the project area. The NAHC provided a list of Native American contacts, and on January 5 and January 12, 2011, DOE sent letters to these contacts inviting them to provide input on the Proposed

Project, including identifying cultural resources and properties of traditional, religious, or cultural importance that may be affected by the proposed undertaking. The letter to the NAHC, the letter from the NAHC, and the list of contacts provided are included in Appendix F, along with a sample letter sent to the Native American contacts on the NAHC list.

DOE identified two additional federally recognized tribes in the area of the proposed PG&E Reconductoring Project. On March 10, 2011, DOE invited the Tachi Yokut Tribe and the Tule River Indian Tribe to enter into government-to-government consultation with the DOE in respect to the Proposed Project. These letters are included in Appendix F.

Non-Federal Consultation Actions

On April 24, 2009, prior to DOE involvement in the Proposed Action, Applied Earthworks, on behalf of the Project Proponent, contacted the NAHC to request a search of its Sacred Lands Inventory file. A search of the file failed to indicate any presence of Native American cultural resources in the immediate project area. The NAHC did provide a list of individuals and groups with knowledge regarding resources of sacred or special cultural and spiritual significance in the project area. On May 29, 2009, Applied Earthworks mailed a letter to each of these contacts summarizing the Proposed Project and soliciting information about the study area. On June 16, 2009, Applied Earthworks followed up with telephone calls to the groups and individuals who had not yet responded to the initial letter. After additional acreage was added to the Project Site, Applied Earthworks notified the contacts for additional consultation in November and December 2009. In subsequent discussions, the Northern Chumash Tribal Council and Santa Ynez Tribal Elder's Council requested face-to-face meetings and/or tours of the Project Site. The Project Proponent and Applied Earthworks met with three Northern Chumash Tribal Council members on January 6, 2010, to discuss the Project, provide additional information about the scope and potential impacts of the solar farm, and tour the Project Site. Similar meetings with Santa Ynez Tribal Elder's Council occurred on June 21, 2010. Concerns raised by the Council included movement corridors for elk and antelope, possible effects of electrical and magnetic fields, avoidance of Native American sites, the likelihood for buried archaeological sites that may be affected, and the possible disruption of the dark night sky which could disturb Native American religious practices.

Environmental Impacts on Issues of Tribal Concern

Native American consultation was initiated and is ongoing. No sacred sites, Traditional Cultural Properties (TCPs), or traditional use areas have been identified, but such areas may be identified as the consultation process moves forward. If such areas are identified, the Proposed Action may have direct and indirect impacts. Such impacts could include incompatibility with traditional use of the area for resource collection or spiritual practices.

As noted above, consultation conducted for the EIR process revealed several concerns. The concerns regarding elk and antelope movement corridor width and electrical and magnetic fields were addressed through Project design, specifically by placing the PV arrays and other equipment in a manner to allow for wildlife movement across the Project Site and having no need for additional high-voltage power lines. Concerns about buried archaeological sites would be addressed through the measures outlined under Alternative A. Concerns about impacts on the night sky were addressed through measures to limit exterior and perimeter lighting and to use shielded lights at the monitoring and maintenance facility, substation, and switching station (see Aes-2 in Table 2-9).

3.12 PALEONTOLOGICAL RESOURCES

Paleontological resources are any fossilized remains, traces, or imprints of organisms that are preserved in the Earth's crust and provide information about the history of life on Earth. Fossil remains may include bones, teeth, shells, leaves, and wood. They are found in geological deposits within which they were originally buried. Paleontological resources include not only the actual fossils, but also the collecting localities and the geological deposits that contain the fossils.

This section describes the affected environment and Environmental Impacts of the Project on paleontological resources at the Project Site.

3.12.1 Affected Environment

Regulatory Framework

There are few federal laws that pertain specifically to paleontological resources. The National Environmental Policy Act is the basic national charter for protection of the environment, and its procedures ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken (40 CFR 1500.1). Regulations state that the nation must preserve important historic, cultural, and natural aspects of the national heritage (42 USC 4331(b)(4)) and enrich the understanding of the natural resources important to the nation (42 USC 4321). Accurate, succinct scientific descriptions and analyses of the affected environment are essential to implementing NEPA (40 CFR 1500.1; 40 CFR 1502.15).

Despite the lack of federal laws, fossils are important scientific and education resources because they document the presence and evolutionary history of life on Earth, enable reconstruction of their environments, help determine the relative age of the geologic strata in which they are found, and record geologic events (Brady 2010). Due to their rarity and scientific importance, vertebrate fossils such as those occurring in the California Coast Ranges area are protected by State and County laws, ordinances, regulations, or policies that apply to this project.

The CEQA guidelines require that public agencies in California identify the environmental consequences of their proposed projects on any object or site of significance to the scientific annals of California. Appendix G of the CEQA guidelines provides information that the lead agency should address regarding a project's impact on significant paleontological resources. If the impact is either "potentially significant" or "less than significant with mitigation," a Paleontological Mitigation Plan must be designed and implemented to protect significant fossil resources. Additionally, CEQA Section 21081.6 requires the lead agency (for this project, San Luis Obispo County) to adopt a monitoring and reporting program to ensure compliance with mitigation measures during the Project's construction and operation.

California Public Resources Code, Section 31244

Public Resources Code, Section 31244 states that "where development would adversely impact…paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required."

San Luis Obispo General Plan Policy CR 4.5

San Luis Obispo General Plan Policy CR 4.5 recognizes the value of paleontological resources and has direction for protecting these resources from the effects of development by avoiding disturbance, where feasible. Subsection CR 4.5.1 requires a paleontological resource assessment and mitigation plan to: 1) Identify the extent and potential significance of the resources that may exist within the proposed development, and 2) provide mitigation measures to reduce potential impacts when existing information indicates that a site proposed for development may contain biological, paleontological, or other scientific resources. Additionally, CR 4.5.2 requires a paleontologist and/or registered geologist to monitor site-grading activities when paleontological resources are known or likely to occur. The monitor would have authority to halt activities to determine the appropriate protection or mitigation measures, which may include collection of the paleontological resources, curation of any resources collected, and documentation with the County.

General Project Area

The La Panza and Caliente ranges bordering the project area are composed principally of middle Tertiary sedimentary strata, while the sedimentary sequences of the Temblor Range are principally late Mesozoic to late Tertiary in age (Dibblee and Minch 2006a, 2006b). The valley floor is covered with late Pleistocene to Holocene alluvium.

The main fossiliferous units in the project area are the Miocene Monterey, Santa Margarita, and Caliente Formations, the Plio-Pleistocene Paso Robles Formation, and the overlying Quaternary alluvium (Brady 2010). The Paso Robles Formation is the most sensitive of these and has yielded vertebrate fossils at several localities in the region, including one nearby site (LACM 5659) that produced mastodon, bison, and camel remains (Jefferson et al. 1992). The

Quaternary alluvium has produced fossil plant molds and fish scales that probably were eroded from older units rather than preserved in the alluvium (Brady 2010; URS Corporation 2007). In addition to this formation, the University of California Museum of Paleontology database records the presence of vertebrate fossils from the uppermost Quaternary alluvium at several localities within San Luis Obispo County. Figure 3-12, Regional Geology, depicts the geologic units in the project area. As shown on this figure, most of the Project Site is Quaternary alluvium, with small areas of Paso Robles Formation in the northeast and small areas of Santa Margarita Formation in the southwest.

Paleontological Surveys

A Phase 1 Paleontological Identification Report (Brady 2010) evaluated whether significant paleontological resources could be encountered at the Project Site. The results of this study are summarized below.

Several paleontological studies and environmental impact reports for the region have described the local geology and paleontological potential (Brady 2010). The Environmental Impact Report for the Carrizo Solar Energy Farm site is the most relevant as it overlaps with the proposed Project Site (URS 2007b). The field survey from the Carrizo Solar Energy Farm report identified molds of fossil plant material, a fossil fish scale in clasts, and insect pupae cases (cocoons) from calcareous sediment in Section 27; however, no vertebrate fossils were found.

The California Berkeley Museum of Paleontology and Natural History Museum of Los Angeles County databases catalog fossil localities in the region. These databases indicate that while vertebrate fossils are generally abundant throughout San Luis Obispo County (Jefferson et al. 1992), no vertebrate fossil localities have been identified on the Project Site.

Paleontological Sensitivity of the Project Area

A stratigraphic unit known to contain significant fossils is considered to be "sensitive" if earth-moving or ground-disturbing activities could disturb or destroy fossil remains in that unit (Brady 2010). Paleontological sensitivity of a stratigraphic unit is based on its potential paleontological productivity and the scientific significance of the fossils it has produced. In its standard guidelines for assessing and mitigating adverse impacts to paleontological resources, the Society of Vertebrate Paleontology (1995) established three categories of sensitivity which are used here:

- High sensitivity: areas where all vertebrate fossils are categorized as having significant scientific value and all stratigraphic units in which they are found are sedimentary in origin and have been known to produce fossils in the past. In these areas, full-time monitoring is recommended.

- Low sensitivity: areas where stratigraphic units are not sedimentary in origin or have not been known to produce fossils in the past. Monitoring is usually not recommended nor needed during excavation.
- Undetermined sensitivity: areas where stratigraphic units have not had any previous paleontological resource surveys or any fossil finds are considered to have undetermined scientific value. After reconnaissance surveys including observations of road cuts, stream banks, and possible subsurface testing such as augering or trenching, an experienced, professional paleontologist can often determine whether the stratigraphic unit should be categorized as having high or low sensitivity.

The Santa Margarita Formation and the Paso Robles Formation in the project area are judged to have high sensitivity for their demonstrated potential to produce paleontological resources. Although no vertebrate fossils have been reported on the Project Site, both formations have reported occurrences of vertebrate fossils in the region. The Santa Margarita and Paso Robles Formations occupy only approximately three percent of the project area, solely along its southwestern and eastern boundary respectively, but they are likely to underlie the alluvium.

The alluvium has undefined sensitivity because its potential to produce vertebrate fossils has not been established. If it includes strata of Pleistocene age, it would be considered high sensitivity, but if it is entirely Holocene, or less than 10,000 years old, it would have low sensitivity.

Reconductoring

Similar to the Proposed Project, the main fossiliferous units in the PG&E Reconductoring Project area are the Miocene Monterey, Santa Margarita, and Caliente Formations, the Plio-Pleistocene Paso Robles Formation, and the overlying Quaternary alluvium (Lichtenstein et al. 2010). Of the named organisms in the Monterey Shale Formation, only the fish remains are considered paleontologically significant, as they are vertebrate animals and do not occur in abundance. The Monterey Formation occurs at the surface in the reconductoring project vicinity along most of the western flank and crest of the Temblor Range, east of the proposed sites of the Caliente Switching Station.

Both marine and non-marine fossils have been collected from localities in the Paso Robles Formation (Addicott and Galehouse 1973 in San Luis Obispo County 2010e). Although confirmed vertebrate fossil localities are rare, the Paso Robles Formation has yielded vertebrate fossils at several localities in the region, including one nearby site (LACM 5659) that produced mastodon, bison, and camel remains (Lichtenstein et al., 2010). A locality reported to be in the Paso Robles Formation near the reconductoring project vicinity probably occurs in younger, overlying Quaternary (Pleistocene) alluvium. The Quaternary alluvium has produced fossil plant molds and fish scales that probably were

eroded from older units rather than preserved in the alluvium (Lichtenstein et al. 2010). In addition to this formation, the University of California Museum of Paleontology (UCMP) database records the presence of vertebrate fossils from the uppermost Quaternary alluvium found at several localities within San Luis Obispo County. A vertebrate fossil locality in the Carrizo Plain, recorded as LACM Locality 5659, was found a short distance south of the west end of the PG&E Reconductoring Project (McLeod 2009 in San Luis Obispo County 2010e).

3.12.2 Environmental Impacts

Determination of significance for paleontological resources can only occur after a fossil has been found and identified by a qualified paleontologist. Until then, the actual significance is unknown. However, fossils are considered to be scientifically significant if they meet or potentially meet any one or more of the following criteria:

- Taxonomy – fossils that are scientifically judged to be important for representing rare or unknown taxa, such as defining a new species.
- Evolution – fossils that are scientifically judged to represent important stages or links in evolutionary relationships, or fill gaps or enhance underrepresented intervals in the stratigraphic record.
- Biostratigraphy – fossils that are scientifically judged to be important for determining or constraining relative geologic (stratigraphic) age, or for use in regional to interregional stratigraphic correlation problems.
- Paleoecology – fossils that are scientifically judged to be important for reconstructing ancient organism community structure and interpretation of ancient sedimentary environments.
- Taphonomy – fossils that are scientifically judged to be exceptionally well or unusually or uniquely preserved, or are relatively rare in the stratigraphy.

For the purposes of this analysis, an impact would be considered substantial if it resulted in the destruction of a scientifically important paleontological resource.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Although no vertebrate fossils have been recorded within the Project Site, several fossil-bearing geologic formations with high sensitivity are located in Study Area A (Brady 2010). Both of these formations underlie the alluvial cover and may be directly impacted due to exposure and/or disturbance during grading or excavation. The Santa Margarita Formation is exposed near the southwest corner of the study area; however, no PV arrays or grading are

currently proposed for this location. Therefore, there is a moderate potential for construction activities to directly impact paleontological resources.

Construction activities would greatly increase the number of people on the Project Site. There is a moderate potential for scientifically important paleontological resources in the underlying geologic formations, therefore, there would be a moderate potential for increased unauthorized collection. To minimize the potential for unauthorized collection of paleontological resources during construction, a Paleontological Monitoring and Treatment Plan would be prepared. This plan would outline the criteria for determining paleontological resource significance and guidelines for whether a resource should be avoided or recovered. It shall be based on Society of Vertebrate Paleontology (SVP) guidelines and meet all regulatory requirements. The qualified paleontologist responsible for developing it shall have a Master's Degree or Ph.D. in paleontology, shall have knowledge of the local paleontology, and shall be familiar with paleontological procedures and techniques. The plan would include a worker environmental awareness training program and construction monitoring requirements. Full-time monitoring would occur during rough grading and for cuts greater than 12 inches below surface in areas with a high paleontological sensitivity; these areas include the Paso Robles and Santa Margarita Formations. Implementation of these measures would lessen direct and indirect impacts from construction to a minor level.

Operation. The potential for unauthorized collection of fossils and other paleontological resources would exist during operation, though to a lesser extent than under construction. Measures to reduce this impact would be similar to those described for construction.

Decommissioning. Any physical disturbance of the geologic formations during decommissioning activities could directly impact (i.e., damage or destroy) paleontological resources. Once the arrays and supporting facilities were removed, no additional direct impacts would be likely. Due to the moderate potential for scientifically important paleontological resources in the underlying geologic formations, there would be moderate potential for damage or destruction. Implementation of the measures described under construction would lessen the potential for direct impacts on paleontological resources during decommissioning activities.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Construction. Study Area B has the same alluvium overlaying the Paso Robles and Santa Margarita formations as Study Area A, with a larger percentage of the Paso Robles Formation found in this study area. As more grading could occur under Alternative B, the increase in ground disturbance would result in a slightly increased potential for encountering and destroying paleontological resources under this alternative. The potential for unauthorized collection of paleontological resources would be the same as described for Alternative A.

Implementation of the measures described under Alternative A would lessen direct and indirect impacts from construction to a minor level.

Operation. The nature and characteristics of operational impacts on paleontological resources would be the same as described under Alternative A. Since Alternative B has a slightly increased potential for encountering paleontological resources, there would be an increased potential for unauthorized collection. Measures to reduce this impact would be similar to those described for construction.

Decommissioning. The nature and characteristics of the direct impacts from decommissioning on paleontological resources would be the same as described under Alternative A; as Alternative B has a slightly increased possibility for encountering paleontological resources, there would be an increased potential for destroying or damaging resources during decommissioning activities. Implementation of the measures described under construction would lessen the potential for direct impacts on paleontological resources during decommissioning activities.

Reconductoring

A potential impact could occur if the PG&E Reconductoring Project affected sensitive, previously undisturbed sediment or sedimentary rock. In areas underlain by geologic units assessed to have high paleontological sensitivity, project-related activities (such as replacement of transmission towers and establishment, improvement, or restoration of access roads) could result in significant impacts on these resources. Replacement of existing conductors and construction of temporary protective structures at road crossings, or any activities underlain by geologic units designated as low sensitivity, are not expected to cause substantial impacts on paleontological resources. It is unlikely that shallow grading and excavations into the younger alluvium would encounter paleontological resources. Deeper excavations or grading may encounter finer-grained sediments or older Quaternary alluvium, which would have a higher potential for paleontological resources.

Deeper excavation may also encounter underlying Paso Robles Formation (Pleistocene and Pliocene age). If encountered, the possibility of impacting significant paleontological resources would be moderate to high, because several vertebrate fossil localities are present west of the region.

Because of the depth of the excavation and the moderate to high probability of encountering resources, the excavation could be considered a substantial impact without mitigation. Application of the same mitigation measures as noted for the Proposed Project would reduce impacts on paleontological resources during construction.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee for the Topaz Solar Farm, and the Proposed Project would not be constructed. Under this alternative, there would be no new impacts on paleontological resources. Impacts on paleontological resources associated with farming and ranching activities would continue under this alternative.

3.13 SOCIOECONOMICS

This section describes the baseline socioeconomic resources of the project area and analyzes potential effects of the Proposed Project on these resources. The socioeconomic resources discussed include demographic information on population and housing and economic conditions such as employment and income.

3.13.1 Affected Environment

The Project Site is located in census tract 127.02 in eastern San Luis Obispo County. Census tract 127.02 includes large areas of eastern, southeastern, and central San Luis Obispo County. The region of influence considered for this socioeconomic evaluation includes San Luis Obispo and Kern Counties. The baseline demographic and economic conditions of the Project Site apply to the general project area, for Study Areas A and B, and for the PG&E Reconductoring Project.

Population

Population data for the region of influence and comparative data for California are presented in **Table 3-22**, Population Profile. Census tract 127.02 is a relatively large (encompassing approximately 1,110 square miles) but sparsely populated area that contained only 2.5 percent of the total population in San Luis Obispo County in 2000. The census tract experienced an approximate 18 percent population growth between 1990 and 2000, which was higher than the 13 percent growth observed in San Luis Obispo County and California during the same period.

TABLE 3-22
POPULATION PROFILE

GEOGRAPHIC AREA	1990	2000	2009
Census Tract 127.02	5,247	6,174	–
Kern County	543,477	661,645	807,407
San Luis Obispo County	217,162	246,681	266,971
California	29,760,021	33,871,648	36,961,664

Source: US Census Bureau 1990, 2000, 2009

In 2009, San Luis Obispo County had an estimated population of 266,971, which was an 8 percent increase from 2000 and consistent with the 9 percent population growth observed in California. In comparison, Kern County experienced a relatively high population growth (22 percent) between 2000 and 2009. The State of California Department of Finance projects that there will be a population growth of approximately 10 percent between 2009 and 2020 for San Luis Obispo County. This projection is relatively small compared to the estimated growth rates of California (19 percent) and Kern County (35 percent) (State of California 2007).

Housing

Housing data including number of units, ownership, occupancy, and median dollar value for the region of influence and surrounding areas is summarized in **Table 3-23**, Housing Characteristics.

TABLE 3-23
HOUSING CHARACTERISTICS[1]

	KERN COUNTY	SAN LUIS OBISPO COUNTY	CALIFORNIA
Total Housing Units			
Total Housing Units	266,880	115,366	13,268,682
Percent Change (since 2000)[2]	15.3	12.8	8.6
Occupancy			
Percent occupied	89.7	89.0	91.8
Percent vacant	10.3	11.0	8.2
Median Price[3]			
2000	$93,300	$230,000	$211,500
2006	$283,000	$581,000	$575,800
2007	$255,000	$536,500	$594,260
2008	$205,000	$455,500	$368,250
2009	–	–	$274,740
2010	$135,000	$400,500	$311,950

[1] Data are from 2005-2009 American Community 5-year Estimates Survey unless otherwise indicated (US Census Bureau 2010).
[2] Percent Change was evaluated using 2000 census data and the 2005-2009 American Community 5-year Estimate Survey.
[3] Median prices of existing homes sold in June 2006, 2007, 2008, 2009, and 2010. Median prices for 2000 are median dollar value of homes reported in Census 2000.
Source: US Census Bureau 2000, 2010; CAEDD 2010a

According to the American Community Survey 2005-2009 five-year estimates, there were approximately 115,366 housing units in San Luis Obispo County. This was a 12.8 percent increase in the number of total housing units since 2000, most of which (10 percent) were built between 2000 and 2004. The estimated vacancy rate in the county was 11 percent, which was greater than the statewide vacancy rate of 8 percent.

After 2006 and 2007, there were significant drops in median home prices in California, from $594,260 in 2007 to $311,950 in 2010. San Luis Obispo County experienced a less significant drop in median home prices than California, and maintained a higher median value ($400,500). Kern County had the lowest median home price ($135,000) and experienced the highest growth in total number of housing units.

Employment and Income

In 2008, per capita income in San Luis Obispo County was estimated at $40,635, less than the average in California ($43,852), though nearly 26 percent higher than the per capita income in Kern County. Despite having a lower average income than California, San Luis Obispo County experienced a faster annual percent increase (4.5 percent) between 2000 and 2008 than the state (3.5 percent). **Table 3-24**, Per Capita Income, summarizes income statistics of Kern and San Luis Obispo Counties as well as the per capita income data for California.

TABLE 3-24
PER CAPITA INCOME

GEOGRAPHICAL LOCATION	2000	2008	AVERAGE ANNUAL PERCENT CHANGE
Kern County	$21,517	$30,047	4.3
San Luis Obispo County	$28,667	$40,635	4.5
California	$33,398	$43,852	3.5

Source: Bureau of Economic Analysis 2010

As listed below in **Table 3-25**, Unemployment Rates, in 2009, San Luis Obispo County's unemployment reached 9 percent, which while still below the state's unemployment rates (11.4 percent), was at its highest since 2000. Kern County had considerably higher unemployment rates during the 2000 to 2009 period.

As shown in **Table 3-26**, government employment was the largest employment sector in San Luis Obispo and Kern Counties. In Kern County, farm employment at 16.4 percent was the second largest industry and surpassed farm employment in San Luis Obispo County by more than 12 percent. Among private industries in San Luis Obispo County, leisure and hospitality, retail trade, education, and health industries had the highest employment and cumulatively accounted for approximately 40 percent of total employment.

TABLE 3-25
UNEMPLOYMENT RATES

GEOGRAPHICAL LOCATION	2000	2005	2006	2007	2008	2009
Kern County	8.2	8.4	7.5	8.1	9.7	14.4
San Luis Obispo County	4.0	4.3	3.9	4.3	5.7	9.0
California	4.9	5.4	4.9	5.3	7.2	11.4

Source: CAEDD 2010b

TABLE 3-26
EMPLOYMENT IN 2009

	KERN COUNTY	SAN LUIS OBISPO COUNTY	CALIFORNIA
Total Labor Force	366,900	137,600	18,250,200
Total Employment	314,100	125,300	16,163,900
Total Unemployment	52,800	12,300	2,086,200
Unemployment Rate (Percent)	14.4	9.0	11.4
Employment by Industry (Percent of Total)			
Total Farm	44,600	3,900	375,800
Construction	13,000	5,300[1]	62,100
Manufacturing	13,200	5,500	1,280,900
Mining and Logging	9,900	–	25,700
Wholesale trade	7,300	2,400	644,200
Retail Trade	25,600	12,800	1,518,100
Transportation, Warehousing and Utilities	9,200	3,800	474,100
Information	2,800	1,300	446,800
Finance, Insurance, and Real Estate	8,500	4,000	797,100
Professional and Business Services[2]	24,000	8,900	2,051,600
Educational and Health Services	25,900	11,300	1,740,200
Leisure and Hospitality	21,000	14,900	1,499,000
Other Services[3]	6,700	4,500	484,300
Government	61,000	23,600	2,497,300

[1] Employment data for San Luis Obispo County aggregates construction, natural resources and mining employment.
[2] Includes scientific and technical services; management of companies and enterprises; and administrative and waste services.
[3] Includes all other services except public administration
Source: CAEDD 2010b

3.13.2 Environmental Impacts

An action would have a substantial impact on socioeconomic resources if the population growth associated with new jobs from construction and operation of the Proposed Project resulted in a significant shortage of existing housing for workers and their families or changed the economic base of the project area.

Proposed Action

Under the Proposed Action, direct and indirect impacts on socioeconomic resources are expected from the addition of job opportunities during construction and operation and from increases in revenue to the tax base. These impacts, which would be the same under Alternative A and Alternative B, are described below.

Construction

Project construction, over three years, would require an average of 400 workers with a peak of approximately 500 workers. The construction workforce would, to the extent possible, be recruited from within San Luis Obispo and Kern Counties, including from population centers such as San Luis Obispo, Atascadero, Paso Robles, Bakersfield, Taft, Templeton, Santa Margarita, McKittrick, and Buttonwillow. Most population centers in the region are 30 to over 70 miles from the Project Site and would generally result in commuting times of 40 to 90 minutes, with commutes of up to 2 hours possible. Such commuting times are long compared to typical commuting times in San Luis Obispo County (20 minutes) and Kern County (23 minutes) (US Census Bureau 2010). However, shuttle buses would be used to transport workers to the Project Site from designated lots in the nearby towns.

While most workers would be recruited from within San Luis Obispo and Kern Counties, there may be a need for some workers to be hired from outside of these counties. The terms of employment for these workers may be brief stays or a longer duration during the construction period. These workers would need temporary housing such as hotels, motels, or private lodging rentals. These temporary housing accommodations would be expected to occur as near to the Project Site as is available, such as in San Luis Obispo or other communities in the project vicinity. As these workers would not represent the majority of the workforce, this need is expected to be absorbed by area accommodations, including accommodations within the communities from which shuttles would operate. However, with overlapping construction requirements of two solar projects, there may be short periods when demand exceeds supply, requiring lodgers to find accommodations at farther distances. Therefore, the Proposed Project is considered to have minor to moderate impacts on the housing supply in the area.

As shown in Table 3-26, in 2009 San Luis Obispo County had a combined construction, mining, and logging employment of 5,300, while Kern County's construction employment was 13,000. A construction workforce of 400 to 500

would represent between 2 and 3 percent of combined construction employment in San Luis Obispo and Kern Counties. The creation of 400 to 500 construction jobs in the region would temporarily reduce unemployment and would have immediate beneficial impacts on employment in the region.

The construction workforce would contribute to the local economy and would have beneficial economic impacts through money spent on lodging, food, retail, and other service industries in the area. In addition, services related to construction of the Proposed Project such as local material suppliers, equipment suppliers, mechanics, and business support services would benefit economically from the construction of the Proposed Project.

Operation

Operation of the Proposed Project would not displace any jobs, as Project lands are currently farmed by the property owners. Operation of the Topaz Solar Farm would require 15 permanent employees who would likely be hired from within San Luis Obispo and Kern Counties. Fifteen permanent employees represent a negligible percent of total workforce in the region. Therefore, sustained beneficial impact as a result of reduction in local unemployment from operation of the Proposed Project would be negligible.

Local governments could benefit economically from tax revenues due to project operation. The Proposed Project would generate an estimated $16 million in new property and sales tax revenues for the County. Over $10 million of this total would come from sales tax revenues during the three years of construction. The purchase of land for use by the Project Proponent is anticipated to create over $5 million in incremental property tax revenues over the life of the Project (First Solar undated).

Decommissioning

Decommissioning activities would have short-term minor to moderate beneficial impacts on local employment similar to construction. Decommissioning would have a long-term localized adverse impact on employment due to the elimination of the 15 jobs associated with operation of the Proposed Project.

Reconductoring

Reconductoring would have a negligible impact on socioeconomics in the region of influence. Most of the work would be carried out by PG&E employees with a maximum estimated construction workforce of 50 individuals. Reconductoring construction would therefore create minimal demand for labor and would have a negligible impact on local employment. The construction workforce would reside temporarily in the surrounding area, primarily in Bakersfield in western Kern County. According to the 2005-2009 American Community Survey 5-Year Estimates, there are 7,937 vacant housing units in Bakersfield, which is much greater than the demand that would be induced by the few reconductoring construction workers who would need temporary housing. Reconductoring would therefore have negligible impact on local housing. Operation of the

reconductored line would require no additional workforce and would have no socioeconomic impact.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee for the Proposed Project, and it is possible that the Project would not be built. Under this alternative, there would be no change resulting from the Project to the existing socioeconomic resources, and there would be no beneficial impacts on employment and local economy of the region.

3.14 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

According to EPA, environmental justice is, "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 should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies" (EPA 2010c).

3.14.1 Affected Environment

Regulatory Framework

Executive Order 12898

In February 1997, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This order requires that "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or Environmental Impacts of its programs, policies, and activities on minority populations and low-income populations" (Executive Order 12898, 59 Federal Register 7629 [Section 1-201]).

CEQ has issued guidance to federal agencies to assist them with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. Guidance recommends that DOE consider pathways or uses of resources that are unique to a minority or low-income community before determining that there are no disproportionately high and adverse impacts on the minority or low-income population (DOE 2004).

Executive Order 13045

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (Executive Order 13045, 62 Federal Register 19885), states that each federal agency shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or

safety risks. Environmental health risks and safety risks mean risks to health or safety that are attributable to products or substances that children are likely to come into contact with or to ingest.

General Project Area

The following sections describe the demographics and poverty status of the populations living in the vicinity of the Project Site. The baseline demographics and poverty status of the Project Site are the same for the general project area and Study Areas A and B.

Demographics

Racial and ethnic data for San Luis Obispo County along with comparative data for California are presented in **Table 3-27**, Total Percentage of Population by Race/Ethnicity. **Figure 3-20**, Census Tracts, describes the census tracts in the project area.

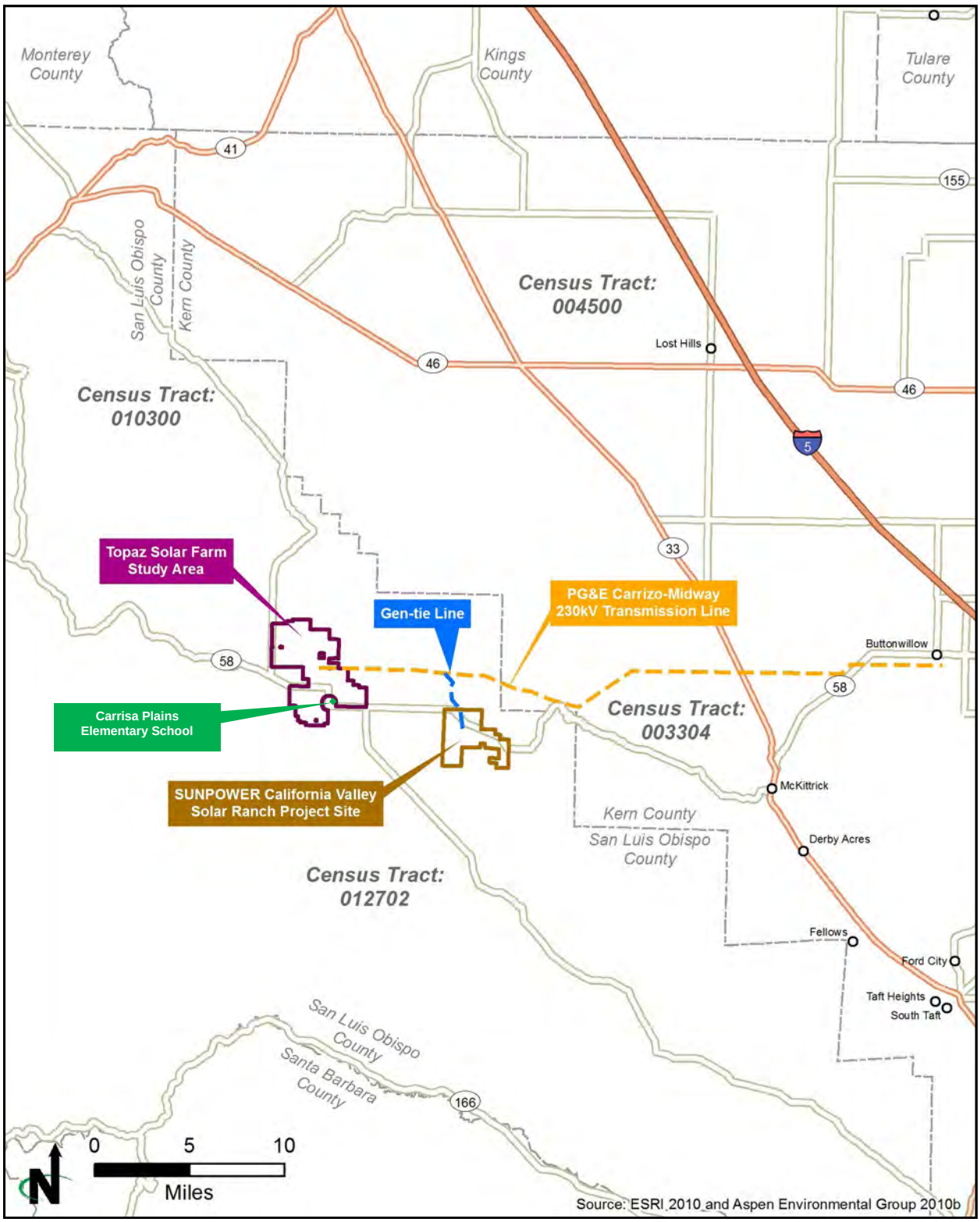
According to the 2000 Census, within census tract 127.02, the White, Not Hispanic or Latino population accounted for approximately 86 percent of the total population, which was statistically higher than the White population in San Luis Obispo County (76.2 percent) and California (46.7 percent). Compared to the state and the county, minority groups in the census tract composed smaller percentages of the total population. The Hispanic and Latino population was also relatively smaller in the census tract (10.4 percent) compared to the county (16.3 percent) and the state (32.4 percent). A similar racial composition was observed in the adjacent census tract 103, which is also located in San Luis Obispo County. Other neighboring census tracts 45 and 33.04 (located in Kern County) had a notably different make-up. Census tract 33.04 had the largest percentage of Blacks and African Americans (11.3 percent), while in census tract 45, people of Hispanic and Latino origin made up nearly 88 percent of the total population, a significant difference when compared to census tract 127.02 and San Luis Obispo County.

According to the 2009 population estimates, the relative percentage of most minority groups in San Luis Obispo County was lower than what was reported in California. The percentage of Asian and Pacific Islander group in the county was less than a quarter of the reported percentage in California. The relative number of Black and African American persons was also small (less than one-third) within the county compared to California. The Hispanic and Latino group in San Luis Obispo County was also relatively small (19.6 percent) compared to the percentage for the state (37 percent). Kern County had a considerably larger Hispanic and Latino group (47.9 percent) than both San Luis Obispo County and California.

TABLE 3-27
TOTAL PERCENTAGE OF POPULATION BY RACE/ETHNICITY[1]

GEOGRAPHIC AREA		NOT HISPANIC OR LATINO[2]						HISPANIC OR LATINO (ANY RACE)[2]	ALL MINORITY[5]
		WHITE	BLACK, AFRICAN AMERICAN	NATIVE AMERICAN, ALASKAN, ALEUT	ASIAN, PACIFIC ISLANDER	SOME OTHER RACE[2]	TWO OR MORE RACES[3]		
Census Tract (2000)[6]									
127.02 – SLO County		86.0	0.2	0.8	0.5	0.1	2.0	10.4	14.0
103 – SLO County		80.0	0.8	0.7	0.7	0.1	2.3	15.5	20.1
45 - Kern County		10.3	0.4	0.3	0.5	0	0.5	88.0	89.7
33.04 - Kern County		70.0	11.3	1.1	2.4	0	0.8	14.7	30.3
County									
Kern	2000	49.5	5.7	0.9	3.3	0.2	2.1	38.4	50.6
	2009	40.3	5.7	0.8	3.8	–	1.6	47.9	59.8
San Luis Obispo	2000	76.2	2.0	0.6	2.7	0.2	2.2	16.3	24.0
	2009	72.6	1.9	0.6	3.2	–	2.1	19.6	27.4
State									
California	2000	46.7	6.4	0.5	11.0	0.2	2.7	32.4	53.2
	2009	41.7	6.0	0.5	12.7	–	2.1	37.0	58.3

[1] Aggregate sum of "Not Hispanic or Latino" plus "Hispanic or Latino (Any Race)" may not add up to exactly 100 percent due to rounding.
[2] "Hispanic or Latino" is considered an ethnicity, not a race. Hispanic or Latino persons may be of any race.
[3] The "Some Other Race" category was eliminated in the 2009 population estimates.
[4] The "Two or More Races" category includes all those that reported a combination of two or more races. All other listed race categories under the "Not Hispanic or Latino" group include all those that reported exclusively a single race.
[5] "All Minority" category includes all Hispanic or Latino of any race and all non-white race groups under the "Not Hispanic or Latino" category.
[6] 2000 Census demographic data is the most recent data available for census tracts.
Source: US Census Bureau 2009; 2000



Construction workers would likely draw from four census tracts, two in San Luis Obispo County and two in Kern County.

Census Tracts

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-20

Census tract 127.02 covers a much larger area of San Luis Obispo County than just the project area; however, knowledge of residents within and immediately surrounding the Project Site indicates that the racial and ethnic percentages for census tract 127.02 presented in Table 3-27 are representative of the population near the Project Site. No minority populations have been identified in the vicinity of the Project Site.

Income and Poverty Level

As shown in **Table 3-28**, Income and Poverty, in 2008 the median household income in San Luis Obispo County was $60,088, which was consistent with the median household income in California ($61,017). The percentage of county's population below poverty (12.1 percent) was also consistent with that in California, which had a 13.3 percent poverty rate. Kern County reported a much higher poverty rate (20.5 percent) and also a considerably lower median household income. There was a general decrease in the number of individuals living below poverty in the region and in California between 2000 and 2008.

TABLE 3-28
INCOME AND POVERTY[1]

GEOGRAPHIC AREA		MEDIAN HOUSEHOLD INCOME	PER CAPITA INCOME[2]	PERCENT POPULATION BELOW POVERTY
Census Tract[3]				
127.02 - San Luis Obispo		$51,091	$22,406	7.9
103 - San Luis Obispo		$51,207	$22,458	11.1
45 - Kern County		$30,547	$10,000	30.1
33.04 - Kern County		$43,369	$18,887	13.1
County				
Kern	2000	$35,466	$15,760	20.8
	2008	$44,716	$30,047	20.5
San Luis Obispo	2000	$42,428	$21,864	12.8
	2008	$60,088	$40,635	12.1
State				
California	2000	$47,493	$22,711	14.2
	2008	$61,017	$43,852	13.3

[1] Data obtained from US Census Bureau Small Area Income and Poverty Estimates (SAIPE) unless otherwise stated.
[2] Data is from the US Bureau of Economic Analysis.
[3] 2000 Census data is the most recent data available for census tracts.
Source: US Census Bureau 2000; SAIEP 2008; Bureau of Economic Analysis 2010

The most recent poverty and income data at the census tract level was obtained from Census 2000. According to this information, census tract 127.02 had a relatively small population (7.9 percent) living in poverty compared to the other census tracts considered for this study. In comparison, within census tract 45 in Kern County, 30.1 percent of the population lived in poverty.

Protection of Children

On average, the population of San Luis Obispo County was older than Kern County and California's population. In San Luis Obispo, 18.7 percent of the population was below 18 and the median age was 39. In comparison, the percent of population below 18 was 25.5 percent in California and 31 percent in Kern County, and the median age was 34.8 and 30.3, respectively (see **Table 3-29**, Age Profile).

TABLE 3-29
AGE PROFILE

GEOGRAPHICAL LOCATION	MEDIAN AGE (YEARS)	PERCENT POPULATION BELOW 18
Kern County	30.3	31.0
San Luis Obispo County	39.0	18.7
California	34.8	25.5

Source: US Census Bureau 2009

The Carrisa Plains Elementary School lies one-third mile from the boundary of Study Area A and one-half mile from the boundary of Study Area B.

3.14.2 Environmental Impacts

A substantial impact related to environmental justice would occur if construction and operation of the Proposed Project would have disproportionately high and adverse effects on minority and low-income populations, on Indian tribes within the region of influence, or on children. Potential impacts would be the same for each alternative.

Minority, minority population, and low-income population are defined by CEQ in Environmental Justice, Guidance under the NEPA (CEQ 1997) as follows:

- Minority. Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.
- Minority population. Minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) 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. In identifying minority

communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as not to artificially dilute or inflate the affected minority population. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the stated thresholds.

- Low-income population. Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census Current Population Reports on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. The most recent racial and demographic statistics for census tract 127.02, in which the Proposed Project is located, and census tract 103, directly adjacent to the Project Site, are from the 2000 census. According to this census information, minority groups are present in the region but the aggregate percentage of all minority groups does not exceed 50 percent of the population and does not exceed the combined percentage of minority groups in San Luis Obispo County or in California. A minority population as characterized by CEQ does not exist in census tract 127.02; therefore, significant adverse impacts on the minority population are not anticipated.

In contrast to census tracts 127.02 and 103, census tract 45 in Kern County, which is five miles northeast of the Project Site, has a minority population–primarily of Hispanic and Latino origin–that exceeds 50 percent. In addition, the percentage of Black and African American persons in census tract 33.04 in Kern County (11.3 percent) is meaningfully greater than percentage of the same group in Kern County (5.7 Percent) and in California (6.4 percent). Minority populations therefore exist within five miles of the Project Site. Any potential direct impacts from construction of the Project such as noise and dust would be minimal at such distances, though construction traffic could affect this population. Traffic impacts on this population would not be disproportionate compared with traffic impacts in the region and would be minimized to the

extent possible. Impacts from traffic are discussed in Section 3.16, Transportation.

In 2000, low-income populations were identified in the area. However, poverty rates within the census tract in which the Project Site is located (127.02) and one that is adjacent to the Project Site (103) were below San Luis Obispo County and California's poverty rates. In contrast, the neighboring census tract, census tract 45 in Kern County, which may be an important source of construction labor, had a large low-income population with poverty levels more than twice those estimated in the county and the state. However, since these populations are more than five miles away from the Project Site, any potential construction impacts that would be experienced would be negligible.

The Carrisa Plains Elementary School is within close proximity of the Project Site; therefore, children have the potential to be disproportionately affected by construction impacts related to dust generation, noise, traffic, and health and safety. To avoid impacts on children, the Proposed Project would be set back from the school by one-third mile, and measures have been proposed to minimize fugitive dust and air pollution, reduce noise levels near residences and the Carrisa Plains Elementary School, minimize truck traffic near the school, and prevent access to construction areas . With the proposed setback from the school and measures to reduce the risk to children, and because the school site is fenced, , the proposed action would not pose a substantial health risk or safety risk to children under either alternative.

Operation. Operation of the proposed facility would not result in a disproportionate impact on a low-income or minority population, as none exist in the immediate project area. Operation would not place children at risk, as Project facilities would be fenced and no public access would be permitted. In addition, operations would not introduce air pollutants or hazardous materials into the environmental pathways; therefore, operation of the facility would not pose a health or safety risk to children at the Carrisa Plains Elementary School.

Decommissioning. Decommissioning of the Project would have impacts similar to those described for construction. For the reasons described for construction, there would be no disproportionate high or adverse impacts on minority or low-income populations from decommissioning.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Potential impacts from construction, operation, and decommissioning would be similar to those described for Alternative A for low-income and minority populations. Alternative B would have a slightly lesser potential for adverse effect on children, as the Project would be developed at a greater distance from Carrisa Plains Elementary School when compared with Alternative A.

Reconductoring

As no minority communities have been identified in the San Luis Obispo County portion of the project area, there would be no disproportionate high or adverse impacts on minority or low-income population from reconductoring actions in this area. However, impacts from construction would have the potential to affect minority populations in Kern County. These impacts would be short-term and would be minimized through measures to reduce air and noise impacts related to construction activities. Reconductoring would not pose a health risk or safety risk to children, as construction sites and material storage areas would be secured.

Operation of the reconductored line and the switching stations would have no environmental justice-related effects over existing conditions.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee for the Propose Project and the Project would not be built. Under this alternative, there would be no impact on low-income and minority populations in the region.

3.15 PUBLIC HEALTH AND SAFETY AND HAZARDOUS MATERIALS AND WASTE

3.15.1 Affected Environment

Regulatory Framework

Occupational Safety and Health Act

The Occupational Safety and Health Act of 1970 recognized that personal injuries and illnesses incurred in a work setting result in reduced productivity, wage loss, and medical expenses. As a result of the act, OSHA was established to ensure the health and safety of workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health (29 CFR Part 1910).

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976 charges the EPA with controlling the generation, transportation, treatment, storage, and disposal of hazardous waste (42 USC 6901 et seq.). RCRA also promulgated a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled the EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Clean Water Act

The Clean Water Act (33 USC Section 1251 et seq., formerly the Federal Water Pollution Control Act of 1972) was enacted with the intent of restoring

and maintaining the chemical, physical, and biological integrity of the waters of the United States. Oil Pollution Prevention regulations describe the requirements for facilities to prepare, amend, and implement Spill Prevention, Control, and Countermeasure (SPCC) Plans. A facility is subject to SPCC regulations if a single oil (or gasoline, or diesel fuel) storage tank has a capacity greater than 660 gallons, or the total aboveground oil storage capacity exceeds 1,320 gallons, or the underground oil storage capacity exceeds 42,000 gallons, and if, due to its location, the facility could reasonably be expected to discharge oil into or upon the "Navigable Waters" of the United States.

General Project Area

Current health and safety risks at the Project Site are related to grazing and dry farming activities. Common risks include accidents related to traffic and farm equipment, and possible exposure to Valley Fever and anthrax. In the context of Public Health and Safety, the affected environment is the same for Study Area A and Study Area B.

Valley Fever

Soils in the study area may harbor the fungus that causes the disease Valley Fever. People working in certain occupations such as construction, agriculture, and archaeology have an increased risk of exposure and disease because these jobs result in the disturbance of soils where fungal spores are found. The usual course of disease in otherwise healthy people is complete recovery within six months. In most cases, the body's immune response is effective, and no specific course of treatment is necessary. About five percent of cases of Valley Fever pneumonia (infection of the lungs) result in the development of nodules in the lung. Another five percent of patients develop lung cavities after their initial infection with Valley Fever – about 50 percent of them disappear within two years. Occasionally, these cavities rupture, causing chest pain and difficulty breathing, and require surgical repair. Anyone who lives in, visits, or travels through the endemic area may contact Valley Fever. The chance of infection is approximately three percent per year. There is no prevention or vaccine at this time. Avoiding activities associated with dust and airborne dirt of native desert soil is recommended, but it is not a certain means of prevention. Some occupations recommend wearing masks (Valley Fever Center for Excellence 2010).

Anthrax

Anthrax is a naturally occurring disease of animals (e.g., sheep, goats, and cattle) caused by the bacterium *Bacillus anthracis*. The bacteria live in the soil in many parts of the world and form protective outer coats called spores. Spores are able to withstand harsh or adverse conditions that would normally kill bacteria. Animals can contract anthrax by ingesting anthrax spores from the soil. Anthrax in animals occurs worldwide but can be controlled by vaccination. People may contract anthrax by contact with infected animals, and the disease in humans is potentially fatal (Centers for Disease Control 2010).

Most outbreaks occur in areas where animals have previously died of anthrax, as the spores remain viable for many years. Spores over 35 years old have been able to cause the disease. Often, the outbreaks occur after climatic changes such as heavy rain, flooding, or drought. Climatic changes bring spores to the ground surface and perhaps concentrate the spores in low spots (UC Extension 2001). Working the land may also bring the spores up to the soil surface. In 1984, an anthrax outbreak occurred in the Carrisa Plains that affected 12 general areas.

Residual Pesticides and Herbicides

Residual pesticides and herbicides could be present in the soil and groundwater in the region due to its history of agricultural land use.

Contaminated Sites

No significant environmental contamination subject to a regulatory cleanup requirement has been identified on the Project Site. An underground fuel storage tank with no record of leaks is reported to have been present (and is possibly still present) near the southwest corner of Study Area A at Goodwin Ranch (Highway 58 and Branch Mountain Road). Limited information in state documentation indicates a former cleanup of contaminated soils at the Carrizo Solar Plant, a former 5-MW PV test plant owned and operated by Arco Solar Power Production in the 1990s. The site also is reported to have had an underground storage tank containing diesel fuel. No violations were reported for the site, and it is unknown whether the underground storage tank is still present (Environmental Data Resources 2009).

Reconductoring

Sensitive Receptors

A review of aerial photography reveals two structures within 1,000 feet of the existing transmission line in the Carrizo Plain and an additional 21 structures within 2,000 feet of the existing transmission line in the San Joaquin Valley. Any of these structures may be occupied residences. The existing transmission line is within 1,500 feet of numerous known residences and one school in the community of Buttonwillow.

Contaminated Sites

A review of contaminated sites along the transmission line right-of-way did not reveal any contaminated sites within or directly adjacent to the right-of-way (San Luis Obispo County 2010a). There are several documented contaminated sites located within one-half mile of the transmission right-of-way.

Wildfire Risk

Reconductoring activities would take place in areas of low and moderate fire hazard severity, as defined by the California Department of Forestry and Fire Protection (Cal Fire). The Carrizo Plain Fire Station (Station 42) serves the area of the westernmost portion of the existing transmission line and switching station sites. This station is staffed 24 hours per day, three days per week;

volunteer responders are on call the remaining four days. The eastern portion of the existing transmission line in Kern County is served by the Kern County Fire Department's Station 25 in Buttonwillow and Station 24 in McKittrick.

Valley Fever
Reconductoring activities would take place in areas that may harbor the fungus that causes the disease Valley Fever. This disease is discussed under General Project Area.

3.15.2 Environmental Impacts

This section describes how implementation of the Proposed Action could potentially impact the health and safety of the public and of construction workers. All activities associated with construction and operation of the Proposed Project would be conducted in accordance with applicable local, state, and federal regulations to protect the health and safety of Project employees and the general public.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction
Hazardous Materials Management. Fuels, oils, lubricants, and solvents would be the primary hazardous and flammable materials that would be on site during construction and operation; these substances would be required for the operation of construction equipment. Potential effects related to breakage of CdTe panels are discussed under operation. Small quantities of additional common hazardous materials would be used on site during construction, including antifreeze and used coolant, latex and oil-based paint, paint thinners and other solvents, cleaning products, and herbicides. Also during substation construction, mineral oil-based transformer oil would be transported to the site for use in the main step-up transformers in the substation. A maximum of 72,000 gallons of mineral oil would be stored on site during construction and operation for this purpose. Medium-voltage transformers would use non-toxic biodegradable vegetable oil (which contains no petroleum). Substation transformers typically contain 10,000 gallons of mineral oil.

If motor vehicle fuels are spilled during transportation to the site, there could be small, localized impacts on soil, surface water, or groundwater, if not promptly identified and correctly handled. Motorists using public access routes could be exposed to these materials if a large-scale spill of hazardous materials were to occur; however, the California Highway Patrol strictly regulates the transport of large quantities of hazardous materials to ensure protection of public health and of the environment. Any large quantities of hazardous materials used during Project construction would be transported by a licensed transporter and would be subject to applicable laws and regulations pertaining

to the transport of hazardous materials, including proper signage on tankers, potential limits on vehicle speeds, and regulations such as stopping at all railroad crossings. In addition, hazardous materials would only be transported during daylight hours, which would avoid any visibility impacts associated with nighttime driving. Transport of hazardous materials associated with construction would therefore pose only a minor risk to people or the environment.

Construction personnel would be trained in the handling and storage of hazardous materials in compliance with OSHA standards; therefore, minor spills on the Project Site could occur, but would be unlikely. The Project Proponent would prepare a Hazardous Materials Storage and Spill Response Plan to address hazardous materials management during Project construction. Additionally, per California Law, San Luis Obispo County would require the Project Proponent to prepare a Hazardous Materials Business Plan, which would include a hazardous material inventory, emergency response procedures, training program information, and basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed.

It is expected that motor vehicle fuel would be stored on site in large-capacity tanks, and large quantities of the biodegradable transformer oil would be contained within PV array and substation transformers during Project construction. San Luis Obispo County would require the Project Proponent to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan, which would require containment of potential spills of these fluids from the on-site storage tanks and transformers. The SPCC would require a secondary means of containment in the case of an accidental release.

The existing houses within the Proposed Project that are to be demolished may contain asbestos, which could be released to the air and inhaled by demolition workers. Workers involved in demolition activities will receive proper training, including the use of personal protective equipment (PPE), as necessary. These materials and all other generated construction wastes would be managed and disposed of in accordance with all applicable regulations under the Resource Conservation and Recovery Act, the Clean Air Act, and equivalent California statutes.

Worker Safety. During Project construction, standard health and safety procedures would be implemented in accordance with OSHA standards to minimize the risk of accidents or injuries. Safety planning and regular training sessions would occur to ensure that workers were adequately prepared to address any anticipated site-specific hazards, such as electrocution, fires, accidents (such as slips, trips, or falls). In addition, workers would be trained on the appropriate use of safety equipment and personal protective equipment.

Workers could be exposed to residual pesticides and herbicides that may be present in soils at the Project Site, but the use of standard field-level OSHA health and safety and dust control practices will mitigate this potential concern.

Valley Fever. Project construction would disturb on-site soils and potentially cause Valley Fever fungal spores to become airborne, potentially putting construction personnel, nearby residents, and wildlife at risk of contracting the disease. The level of risk would be similar to that experienced for any construction project, and lower than that of agricultural plowing, which does not use dust suppression. The potential for exposure to Valley Fever would be reduced through the typical construction dust suppression measures that are included as part of the Proposed Action.

Anthrax. Construction of the Proposed Project would also occur in an area that may harbor naturally occurring anthrax in the soil. Humans can contract anthrax via contact with infected livestock. No livestock would be present on the Project Site during construction, and construction personnel would therefore not have the potential for exposure.

Public Safety. Construction sites can also pose a safety hazard for members of the general public, if they are able to access the site on an unauthorized basis. The four 10-acre construction staging areas would be fenced to prevent access, and the Project Site would be monitored to prevent access by members of the general public. Construction of the Proposed Project would not involve open pits or large structures that would pose safety risks.

Wildland Fires. The Project Site is in a high fire hazard severity zone according to the California Department of Forestry and Fire Protection (Cal Fire 2010). Project Site grasslands could be ignited from welding sparks, fires from equipment malfunction, and other activities, including smoking by construction personnel. Such grassland fires could pose a health and safety risk to personnel or the scattered residences in the vicinity of the Project. While the on-site grasses provide fuel for only a moderate fire hazard, extreme weather conditions could cause a grass fire originating at the site to spread out of control and pose a risk to life and property on the Carrizo Plain. As part of the Proposed Project, the Project Proponent would ensure that vegetation is managed to minimize vegetative fuel buildup. To reduce the risk of ignition from Project activities, the Project Proponent has developed and would implement a Wildfire Management Plan (Appendix G), which would reduce or eliminate risks. In compliance with the Wildfire Management Plan, the Project Proponent would identify additional fire safety practices and site vegetation maintenance activities during construction and site operation. The plan would require a suite of fire safety practices; these practices would prevent accidental ignitions at the Project Site and would ensure that, in areas within 30 feet of occupied structures such as the monitoring and maintenance facility and the Solar Energy Learning Center, the vegetation would be maintained at a height no greater than

four inches, and at other heights and residual dry matter (RDM) criteria in other locations. These measures would ensure that an ignition at the site would not result in a significant fire hazard, and nearby residents would not be at substantial risk of death or property loss. San Luis Obispo County requires that the Project Proponent install sufficient electrical safety signage using weather-resistant and fade-proof materials to provide reasonable notice to Project employees and visitors.

Residual Pesticides and Herbicides. Adherence to OSHA standards, combined with dust suppression, would acceptably limit the risk of worker exposure to residual pesticides and herbicides in project area soils.

Exposure to Contaminated Sites. No significant environmental contamination subject to a regulatory cleanup requirement has been identified on the Project Site. The underground fuel storage tank with no record of leaks that is reported to be present at the nearby Goodwin Ranch is not expected to have resulted in any contamination on the Project Site. Construction workers will be trained on the proper procedures to recognize and address any potential contamination discovered at the Project Site during construction activities. If any contamination is discovered, it will be handled by appropriately trained personnel, in compliance with all applicable laws.

Operation

Hazardous Materials Management. During operations and maintenance, small quantities of hazardous materials would be periodically and routinely transported, used, and disposed of. These materials would consist primarily of minor amounts of petroleum products (fuels and lubricating oils) and a small-to-moderate amount of motor vehicle fuel. Small quantities of additional common hazardous materials would be used on site, including antifreeze and used coolant, latex and oil-based paint, paint thinners and other solvents, cleaning products, and herbicides.

Minor hazardous materials releases could occur due to improper handling and storage practices during operation and maintenance activities. Potential impacts related to such releases would be minimized by training personnel in the handling and storage of hazardous materials in compliance with OSHA and other applicable environmental health and safety standards. Additionally, per California law, San Luis Obispo County would require the Project Proponent to develop and implement a Hazardous Materials Business Plan to ensure proper storage and treatment of hazardous materials during operation.

Accidental release of motor vehicle fuel or transformer oil could impact localized soil, surface water, or groundwater, if not promptly dealt with. The Project Proponent would be required to prepare a SPCC Plan for the Proposed Project covering potential spills of these fluids. All transformers would comply with Federal SPCC requirements, which mandate that the transformers be

placed in such a way that a release of the entire volume of oil in a transformer would not discharge into a surface water and would be promptly cleaned up.

Herbicides, which may be used to manage vegetation growth around Project structures, may pose a risk to human health or ecological receptors if applied incorrectly; however, San Luis Obispo County would require the Project Proponent to use a licensed herbicide applicator, which would reduce this impact.

The health and safety of on-site personnel, the public, and the environment could be at risk from improper storage, transport, or disposal of hazardous waste generated during Project operation. San Luis Obispo County would require the Project Proponent to develop and implement a hazardous waste management plan, which would ensure proper storage, transport, and disposal of hazardous materials generated on site.

As described in Section 2.3.5, First Solar has established a pre-funded PV Module Collection and Recycling Program to promote the collection and recycling of modules. The program enables all components of the modules, including the glass and the encapsulated semiconductor material, to be recycled into new modules or other products.

Potential Hazards Associated with PV Modules. The PV modules use a Cadmium-Telluride (CdTe) semiconductor technology, and the cadmium in the PV modules is in the environmentally stable form of the CdTe compound rather than a metal (National Renewable Energy Laboratory 2010). Also, a CdTe PV module contains very little cadmium, as it consists of less than 0.1 percent cadmium by weight. Furthermore, during the manufacturing process the thin layer of CdTe, approximately half the width of a human hair, is bound to a glass sheet by vapor transport deposition, followed by sealing the CdTe layer with a laminate material and a second glass sheet. In essence, the design of the module results in complete encapsulation of the CdTe.

Several peer-reviewed studies have evaluated the environmental, health, and safety aspects of CdTe PV modules. These studies have consistently concluded that during normal operations, CdTe PV modules do not present an environmental risk (French MEEDAT 2009). Specifically, it has been demonstrated that there are no cadmium emissions to air, water, or soil during standard operation of CdTe PV systems (French MEEDAT 2009).

CdTe releases are unlikely to occur during accidental breakage (Fthenakis 2004). Furthermore, studies have been conducted of the modules when the stability of the encapsulation is jeopardized such as if a broken module was exposed to fire. These studies indicate that even these events result in negligible cadmium emissions, most likely because CdTe has a very high melting temperature of 1041 degrees Celsius (Brookhaven National Laboratory 2005). Additionally, grass fires are the most likely fire exposure for ground-mounted PV systems,

and these fires tend to be short-lived due to the limitations on available fuel. As a result, these fires are unlikely to expose PV modules to prolonged fire conditions or to temperatures high enough to volatilize CdTe.

Even if a grass vegetation fire at the site could reach that temperature, the actual loss of CdTe from a module would be insignificant (approximately 0.04%) (Fthenakis 2005). For these reasons, Fthenakis concluded that "the probability of sustained fires and subsequent emissions in adequately designed and maintained utility systems appears to be zero."

When modules are broken, or at the end of their useful life, exposure risks associated with the thin layer of CdTe semi-conductor material are minimized because of the encapsulation of the semi-conductor material within the PV module and because the CdTe can be effectively recycled at the end of the modules' life. In addition, First Solar, the PV module manufacturer for the Proposed Project, has established a comprehensive, pre-funded module collection and recycling program. The program is designed to maximize the recovery of valuable materials for use in new modules or other new products and minimize any potential environmental impacts associated with PV system production. Approximately 90 percent of each collected PV module can be recycled into new products, including new PV modules. The estimated collection and recycling costs are built into the price of every module sold, so First Solar's modules may be returned to the company for recycling at no cost to the end user. This provides the end user with strong incentives to use the recycling program. Under current law, PV modules would constitute California-only hazardous waste at end of life and therefore could not be disposed in municipal landfill. Whoever owns the modules at that time would be required to adhere to all applicable laws. While First Solar has established a program that pre-funds the recycling of all modules and there are clear incentives for owners of the Project to utilize the program, any modules that are not recycled would have to be disposed in compliance with all applicable federal, state, and local laws. For these reasons, the use of CdTe in PV modules for this Project would pose negligible risks to human health and safety and the environment.

Destructive Acts. The fire risk for a PV solar project is very low due to the limited use of combustible materials in the Project components. The PV modules are composed of noncombustible materials (metal and glass), and the site would be managed as indicated in the Wildfire Management Plan. Therefore, the risk of unintentional destructive acts caused by fire would be very low.

With regard to intentional destructive acts, the Project Site would be fenced and access restricted via a security gate. The Project Proponent would provide 24-hour security to discourage any destructive behavior or acts of vandalism. In addition, to ensure Project security, a Perimeter Intrusion Detection System (PIDS) will be installed along the perimeter fence. The PIDS includes sensors that can detect if someone touches the fence. It will be tuned for sensitivity to

avoid being triggered by wildlife. This PIDS eliminates the need for lighting or security cameras at the perimeter, and regular patrols will not be needed. Security personnel will monitor the system from the monitoring and maintenance facility and respond to alarms. Approximately two patrols per day of the Project perimeter will be conducted by security personnel in pick-up trucks. A few security cameras will be located on site as backup. With these security measures in place, the risk of intentional destruction would be negligible.

Wildland Fires. Project area grasslands could be ignited from operation and maintenance activities such as welding sparks, fires from equipment failure, and other activities, including smoking by Project personnel or guests. Such grassland fires could pose a health and safety risk to personnel or the scattered residences in the vicinity of the Project. Sparks from equipment failure would be unlikely to ignite a wildfire since substation equipment and inverters would be sited on concrete foundations and inverters would be housed in steel and concrete equipment enclosures (the PCS). All electrical equipment would be built to industry safety design standards, further reducing the risk of electrical fires at the site. PV array wiring may remain "hot"; that is, it may carry an electrical charge, after being disconnected during daylight hours. If PV modules are disconnected by trespassers, operations personnel, or during dismantling, live wires could result in a wildfire ignition if they were to come into contact with vegetation. Vegetation in areas within 30 feet of occupied structures, such as the Solar Energy Learning Center, would be maintained at a height no greater than four inches, and at other heights and residual dry matter (RDM) criteria in other locations. These measures would ensure that an ignition at the site would not result in a significant fire hazard and that nearby residents would not be at substantial risk of death or property loss. Non-emergency maintenance activities would cease during extreme weather conditions, further reducing the risk of wildland fires.

The presence of electrical infrastructure over thousands of acres of grassland fuels presents a barrier to firefighting operations since power flow in PV modules cannot be shut off during daylight hours. Grass fires occurring within energized arrays can be fought with normal firefighting techniques, while being careful not to damage the arrays and cause an electrical or chemical hazard. The presence of PV arrays could interfere with the protection of property within and directly adjacent to the arrays if access cannot be easily and quickly obtained and vegetation loads are too high; measures to prevent fires and minimize the fuel load are detailed in the Draft Wildfire Management Plan, including maintaining vegetation at appropriate levels, reducing potential impacts associated with wildland fire.

Worker Safety. During operation and maintenance, standard health and safety procedures would be implemented in accordance with OSHA standards to minimize the risk of accidents or injuries.

Valley Fever. Project operation and maintenance activities would not disturb on-site soils and would not create a risk for Valley Fever fungal spores to become airborne.

Anthrax. Operation and maintenance personnel could contract anthrax through contact with infected sheep that are grazing the Project Site. Animals that graze the site would be brought on site after vegetation has stabilized, and the Project would not result in the exposure of the sheep to higher risks of contracting anthrax than under existing conditions. Project operation and maintenance would not result in an elevated risk of humans contracting anthrax.

Public Safety. The entire Project Site would be fenced and would not pose any threats to public safety.

Decommissioning. Public health and safety risks during the decommissioning phase of the Project include worker safety, Valley Fever, hazardous materials management, and wildfire risks. All of these risks, and corresponding mitigating elements, are addressed above, in the discussions for construction and operation. Decommissioning also presents the risk of improper disposal or recycling of PV modules. First Solar's pre-funded Module Collection and Recycling Program, described in Section 2.3.4, would enable the pre-funded transportation and recycling of the PV modules, minimizing the potential for improper disposal of end-of-life modules. In addition, the owner of the Project, at the time of decommissioning, would be required to comply with applicable hazardous or solid waste requirements regarding the handling and disposal of end-of-life PV modules.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Impacts under Alternative B would be the same as those described for Alternative A.

Reconductoring

Public health and safety concerns from reconductoring are related to the ignition of wildfires, spills of hazardous materials, and exposure of personnel and the public to Valley Fever, similar to those impacts described for the Proposed Project, above.

Wildfire Risk. Reconductoring activities would take place in areas of low and moderate fire hazard severity, as defined by Cal Fire.

Hazardous Materials Management. Fuels, oils, lubricants, and solvents would be the primary hazardous and flammable materials on site during reconductoring and would be required for the operation of construction equipment. Minor hazardous materials releases could occur due to improper handling and storage practices during construction activities. Potential impacts related to such releases would be minimized through measures such as developing and implementing an environmental training and monitoring program for all

personnel, establishing a hazardous substance control and emergency response plan, and establishing a site-specific health and safety plan.

Refueling of construction equipment would mostly take place at landing zones or construction yards along the transmission line, with equipment being refueled along the transmission line, if necessary. Minor amounts of hazardous waste would be generated within PG&E's proposed construction area as a result of the reconductoring work.

The old conductor would be disposed of in an appropriate landfill facility.

PG&E would likely use herbicides to manage vegetation growth around structures and switching stations. The proposed reconductoring work would extend the life of the transmission line and therefore also extend the timeframe of vegetation management activities. Herbicide use would pose a potential risk to human health or ecological receptors if applied incorrectly; however, this risk would be minimal since applications would only be allowed by qualified personnel.

Valley Fever. Reconductoring activities would take place in areas that may harbor the fungus that causes the disease Valley Fever. Measures for minimizing fugitive dust have been included in Project plans and would also minimize the risks associated with Valley Fever.

Electromagnetic Fields (EMF). EMFs are associated with electromagnetic radiation. Electric and magnetic fields are common throughout nature and are produced by all living organisms. Concern over EMF exposure, however, generally pertains to human-made sources of electromagnetism and the degree to which they may have adverse biological effects or interfere with other electromagnetic systems. Possible health effects associated with exposure to EMFs have been the subject of scientific investigation since the 1970s. Reviews of the scientific literature have consistently indicated insufficient evidence of an association between EMF exposure and adverse health effects in humans.

No Action Alternative

Under the No Action Alternative, no solar farm would be constructed, and there would be no change to existing public health and safety conditions.

3.16 TRANSPORTATION

3.16.1 Affected Environment

The region of influence for transportation includes the local and regional transportation features that would be used for deliveries and employee access to the project area during construction and operation of the Proposed Project.

Regulatory Framework

Code of Federal Regulations, Title 49, Subtitle B
Title 49, Subtitle B regulations govern the transportation of hazardous materials. The Department of Transportation's Office of Hazardous Materials Safety is the federal safety authority for the transportation of hazardous materials by air, rail, highway, and water. The Federal Motor Carrier Safety Administration is responsible for the issuance, administration, and enforcement of safety regulations for commercial motor vehicles.

San Luis Obispo County General Plan
All County-maintained roads in San Luis Obispo County are judged by a level of service (LOS) standard whereby roads in urban areas should be LOS D or better and those in rural areas should be LOS C or better (San Luis Obispo County 1979). LOS status is gauged by the average flow of traffic–roads at LOS A experience regular free flow of traffic while roads at LOS F experience regular traffic jams.

San Luis Obispo Council of Governments Regional Transportation Plan
This San Luis Obispo Council of Governments plan delineates a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in the region and integrate new requirements of state law to address the interrelationship of transportation and land use policies and practices (SLOCOG 2010).

CalTrans Level of Service Standards
The CalTrans target LOS for state highway facilities is at the transition between LOS C and LOS D. In cases where this is not feasible, CalTrans recommends that the lead agency consult with CalTrans to determine the appropriate target LOS (CalTrans 2002). The CalTrans Transportation Concept Report for Highway 58 indicates that LOS D or better is considered acceptable for the segment from Pozo Road (east of US 101) to the San Luis Obispo/Kern County line and that LOS C or better is considered acceptable within Kern County. The Transportation Concept Report for Highway 46 indicates that LOS C or better is considered acceptable for the segment from Jardine Road to the San Luis Obispo/Kern County Line and within Kern County. The Transportation Concept Report for Highway 33 indicates that LOS C or better is considered acceptable for the segment from Highway 46 to Highway 58. Lower LOS ratings would be considered unacceptable or subject to consultation and review by CalTrans on a case by case basis.

California Code of Regulations, Title 27 California Vehicle Code
Division 15, chapters 1 through 5 (Size, Weight, and Load) include regulations pertaining to licensing, size, weight, and load of vehicles operated on highways.

California Street and Highway Code §§ 660-711, 670-695
California Street and Highway Code §§660-711 and 670-695 require permits from CalTrans for any roadway encroachment during truck transportation and delivery, including regulations for the care and protection of state and county highways and provisions for the issuance of written permits, and requires permits for any load that exceeds CalTrans weight, length, or width standards for public roadways.

Project Area Roadways
Roads in the project vicinity that could be affected by Project-related traffic are described below.

Highway 58
The Project Site is located on Highway 58. Access to the Project Site would be provided from Bitterwater Road (approximately one mile north of Highway 58) and at two to three locations on Highway 58. In the project area, Highway 58 ranges from a straight to moderately curvy two-lane highway with lane widths that vary from 10 to 12 feet. The roadway has portions of unpaved shoulders that vary from good condition to being overgrown with vegetation. The portion of roadway between Soda Lake Road and Seven Mile Road has many dips in the foothills near Seven Mile Road. From San Luis Obispo to the Kern County line to the east, Highway 58 includes portions of road with shoulders of zero to two feet on rolling terrain with moderate to steep grades and sharp turns (CalTrans 2003). From the Kern County line east to Highway 33, Highway 58 is a two-lane conventional highway with lane widths of 9 feet to 12 feet and shoulder width sections of zero feet over mountainous terrain (CalTrans 2004).

On either side of the Project Site Highway 58 is designated as a California Legal Advisory Route. This designation permits California Legal trucks, but carries an advisory for a maximum kingpin to rear axle length of 30 feet. Trucks with a kingpin to rear axle longer than 30 feet are not prohibited but are discouraged from using this road. Current traffic volumes near the Project Site are low, with approximately 340 vehicles per day on average (Wood Rodgers 2010).

Approximately 26 miles east of the Project Site, Highway 58 crosses Highway 33 before intersecting with Interstate 5 approximately 17 miles further east. The roadway is occasionally closed due to flooding. Pavement is in generally good condition.

Highway 58 is classified as a recreational bicycle route in San Luis Obispo County (San Luis Obispo County 2007) and portions of the road are popular for bicycling. Class III bike lanes are present sporadically on the few sections of Highway 58 where shoulders exist along the road. The section of Highway 58 between Santa Margarita and Shell Creek Road, east of the Project Site, forms part of the route of the popular Wildflower Ride, an annual one-day ride that attracts more than 1,000 cyclists.

Bitterwater Road

A paved county route with no dividing line, Bitterwater Road provides ingress and egress at the Project Site. This route has a low traffic volume; two observed sections of the road have average daily traffic values of 48 and 112 vehicles. The total roadway width varies from 20 to 24 feet and has portions of unpaved shoulders in fair condition. The southern portion of the roadway has a yellow center line stripe that separates travel lanes. No posted speed limit is present along the roadway, except at curves. Pavement condition is fair to poor. Approximately seven cattle guards, some privately maintained, are present across the roadway. Bitterwater Road begins at Highway 58 near the Project Site boundaries and runs north towards Highway 41 and Highway 46 near Shandon, a census-designated place approximately 30 miles northwest of the Project Site.

Shell Creek Road

Shell Creek Road can be used to access Highway 58. A paved county route with no dividing line, Shell Creek Road connects Highway 46 (via San Juan Road) to Highway 58 approximately 23 miles west of the Project Site. Shell Creek Road has a low traffic volume, with an average daily traffic value of 126 vehicles (San Luis Obispo County 2010a). Pavement condition is generally fair to good, though some sections are in poor condition. The roadway is 18 to 20 feet wide, generally has poor sightlines, and is sometimes closed due to flooding. Shell Creek Road is also popular for bicycling and is part of the route of the annual one-day Wildflower Ride.

San Juan Road/Sweetwater Road

San Juan Road/Sweetwater Road is a San Luis Obispo County-maintained road that extends from Highway 46 in Shandon to Shell Creek Road. The roadway has some gentle curves and varies in width from 20 to 24 feet, with portions of an unpaved shoulder in fair to good condition. The northern portion of the roadway between Highway 41 and Toby Way is unpaved. The roadway is occasionally closed due to flooding. Pavement condition is generally poor. This road's intersection with Highway 46 can be problematic for trucks, especially those turning left during times of heavy highway traffic.

La Panza Road

La Panza Road is an east-west, two-lane county road that begins approximately 25 miles west of the Project Site at Highway 58 and connects to Highway 41, before becoming Creston Road and accessing Paso Robles. As it approaches Paso Robles, La Panza Road has a high traffic volume; average daily traffic is 1,145 vehicles. West of Shedd Canyon Road, average daily traffic is 383 vehicles (San Luis Obispo County 2010a). The City of Atascadero can also be accessed via this route. Pavement is in generally good condition, though shoulders are not present on either side of the road.

Bitterwater Valley Road

Bitterwater Valley Road is predominantly a Kern County-maintained road that extends southwest from Highway 46 to Bitterwater Road north of the Project Site. However, a one-mile portion of Bitterwater Valley Road passes through San Luis Obispo County. The total roadway width varies from 20 to 22 feet, has no striping, and has portions of unpaved shoulders in fair condition. No posted speed limit is present along the roadway. Pavement condition is fair to poor.

Highway 41

Highway 41 is a state highway north of the project area, crossing through Atascadero and eventually meeting Interstate 5 to the northeast. Shell Creek, La Panza, and Bitterwater Roads all eventually intersect Highway 41. Lane widths are 10 to 12 feet and the pavement is generally in good condition. Average daily traffic volume near its intersection with La Panza Road is 2,100 vehicles (CalTrans 2009a). Highway 41 is California Legal Advisory Route subject to 32- and 30-foot kingpin to rear axle restrictions.

Highway 46

Highway 46 is a state highway located approximately 18 miles north of the Project. It is co-located with Highway 41 for several miles east of Shandon. Lane widths are 10 to 12 feet, and the pavement is generally in good condition. Daily traffic volumes are very high, with approximately 40,200 vehicles at its junction with Paso Robles Airport Road. East of its intersection with Bitterwater Road, nearer the Project Site, the average daily traffic volume is 28,800 vehicles (CalTrans 2009a). As a Terminal Access route, Highway 46 is not subject to kingpin to rear axle restrictions.

Interstate 5

Interstate 5 is a north-south, four-lane divided highway east of the Project Site. Interstate 5 has interchanges at Highways 46 and 58.

US Route 101

US 101 is a four-lane highway located approximately 40 miles west of the Project Site that runs between Los Angeles and San Francisco. The nearest interchanges are with Highways 41, 46, and 58.

Additional Local Routes

Within Study Areas A and B is a network of unpaved routes that serve utility lines, scattered rural residences, open space, and agricultural lands.

Airports

San Luis Obispo County is home to three public airports: Oceano County Airport, Paso Robles Municipal Airport, and San Luis Obispo County Regional Airport. Of these, San Luis Obispo County Regional Airport is the only one currently accepting commercial traffic. It is also the closest public airport to the Project Site, located approximately 35 miles west.

There is a private airstrip located approximately two miles south of the Project Site that is occasionally used for emergency medical helicopter evacuation by different state and federal agencies.

3.16.2 Environmental Impacts

Transportation impacts would be considered substantial if construction or operation of the Proposed Project resulted in one of the following:

- LOS on a project area roadway was degraded from an acceptable level to an unacceptable level as a direct result of Project-related traffic;
- Conflicted with local or regional transportation plans; or
- Resulted in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Under the Proposed Project, construction traffic would access the Project Site via westbound Highway 58 from Interstate 5. This route was designated Truck Route Option 2 in the Draft EIR for the Topaz Solar Farm (San Luis Obispo County 2010a) and is the Project Proponent's proposed route. The Project Proponent has prepared the Topaz Truck Management Plan to minimize safety and congestion concerns related to project construction traffic, as described in the construction analysis, below.

Worker commute trips and equipment and material deliveries related to construction of the Proposed Project would temporarily affect the local transportation network. Construction-related traffic would not result in a decrease in level of service on area roadways; however, individual drivers would experience delays along a section of Highway 58 east of the Project Site during the time in which the Topaz Truck Management Plan is implemented. These potential construction-related impacts are discussed below.

Worker Transportation. Shuttle buses would transport most workers to and from the Project Site during the three-year construction period (see Tra-2 in Table 2-9). These buses, carrying approximately 20 employees each, could travel on Highway 58, Shell Creek Road, and Highways 41 and 46, depending on the designated pickup location in nearby towns. With an average of approximately 400 workers employed during the construction period and a peak of 500 workers, shuttle buses would make an average of 23 round trips daily throughout the construction period. Approximately 55 daily round-trips, on average, would be made in personal vehicles for those workers not traveling via shuttle bus, with a peak of 85 daily round-trips. Construction workers traveling

in personal vehicles would likely utilize some combination of the roads described for the project area.

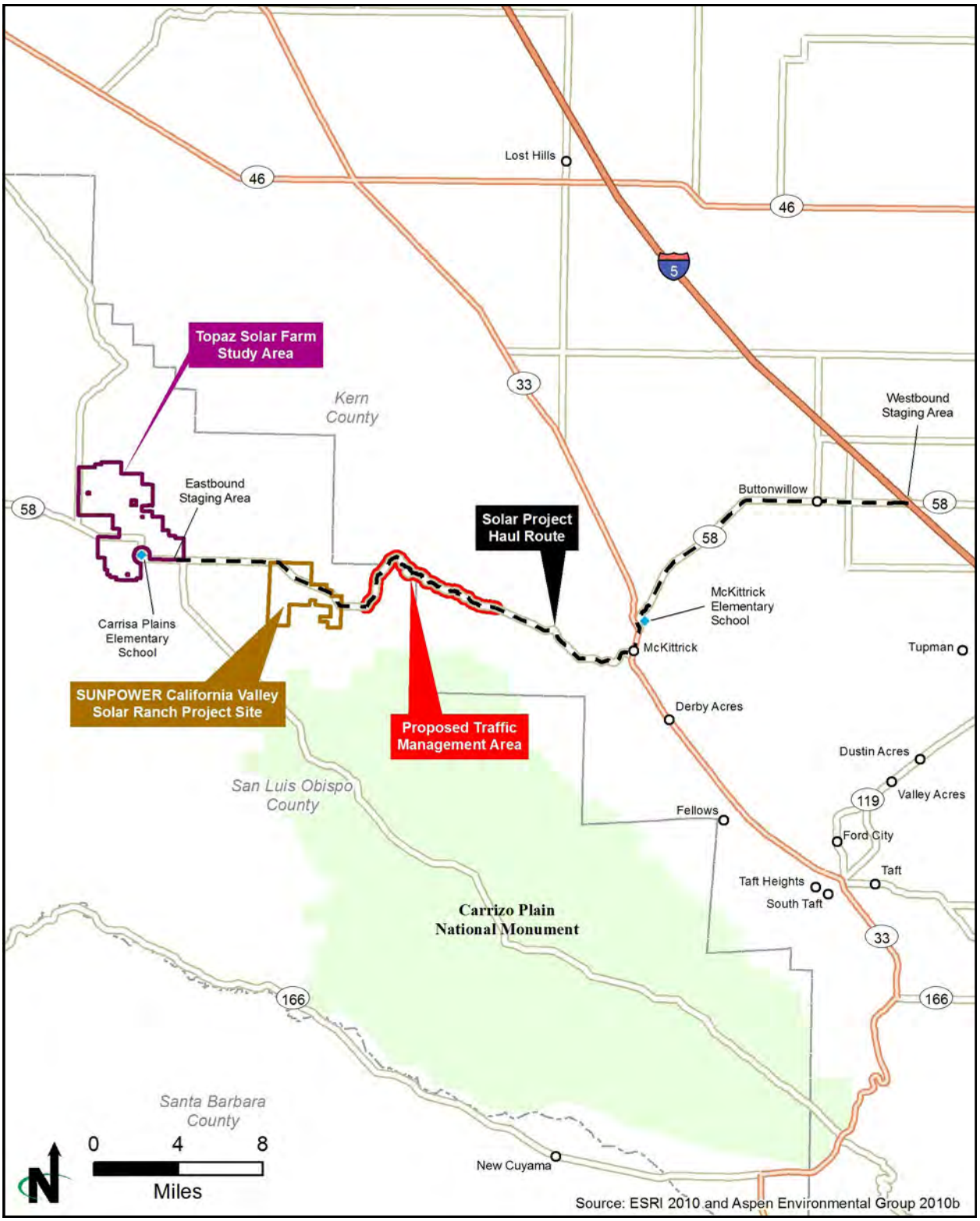
Equipment and Materials Delivery Transportation. Most truck deliveries would access the site via westbound Highway 58 from Interstate 5 (**Figure 3-21**, Truck Haul Route). Approximately 11,540 deliveries during the three-year construction period would be on trucks exceeding the 30-foot Kingpin to Rear Axle Advisory for the 8- to 9-mile section of Highway 58 near the border of Kern and San Luis Obispo Counties. To mitigate transportation impacts along this stretch of road, the Project Proponent would implement the Topaz Truck Management Plan. Per the conditions of this plan, trucks that exceed the 30-foot Kingpin to Rear Axle Advisory (including oversized loads) would assemble at a truck staging area and then proceed in groups through a proposed traffic control area (TCA) with pilot car escorts (the TCA is shown on Figure 3-21). The Travel Centers of America truck stop located at the Highway 58 interchange with Interstate 5 would serve as the westbound truck staging area, where trucks would wait for their pilot vehicle escorts.

Per the Topaz Truck Management Plan, trucks would be escorted through the TCA of Highway 58 at regularly scheduled times on weekdays between the hours of 9 AM and 4 PM, thereby avoiding commute times or other peak traffic periods. Before trucks are sent through the TCA, an escort car would travel the opposite direction to ensure the stretch of road is clear of traffic.

This sweep by a pilot car to ensure the roadway was clear would take approximately 14 minutes, after which the pilot car would lead a group of trucks through the TCA. Vehicular traffic would be permitted to follow the trucks, and drive time for the pilot car-guided convoy would be approximately 21 minutes. Existing traffic volumes along this segment of Highway 58 during the proposed escort period (9 AM to 4 PM) range between 7 and 14 vehicles per hour in each direction (Wood Rodgers 2010).

Trucks returning from the Project Site, along with any vehicular traffic traveling in an eastbound direction at the same time, would be subject to the same escort and pilot car system in reverse. Trucks waiting to return eastbound on Highway 58 to Interstate 5 would be staged at a construction staging area within the Project Site boundary. The TCA restrictions would be in place for the expected three-year construction period. It is estimated that up to three eastbound and three westbound truck escorts per day would be required. Each escort would include an average of 12 equipment and materials delivery trucks.

Several private ranch roads feed into Highway 58 within the TCA. Outbound traffic would be restricted at the ranch road connections when trucks are being escorted through the TCA. Ranch road traffic could proceed in the direction of the escorted trucks but not in the opposite direction. Other sections of Highway 58 would not be subject to delays or restrictions resulting from Project construction.



Most truck deliveries would access the proposed Topaz Solar Facility site via westbound Highway 58 from Interstate 5.

Truck Haul Route

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-21

In addition to the measures described above, the Project Proponent will comply with the CalTrans Construction Zone Enforcement Enhancement Program requirements, with the project-specific requirements identified by the Resident Engineer and verified by actual operations as observed by the State Representative during construction.

The Navajo Creek mine, located approximately 10 miles west of the Project Site, or the Twisselman gravel mine, being permitted with the CVSR project, would provide aggregate for the Proposed Project, resulting in a peak of 40 and an average of 3.5 (Alternative A) or 6.7 (Alternative B) daily round trips. Trucks delivering aggregate would travel on Highway 58 west of the Project Site and would not pass through the TCA or be subject to the Truck Management Plan.

Table 3-30, Study Area Roadways Level of Service, displays current traffic levels and those anticipated during the construction period. The table accounts for equipment and materials delivery trucks, shuttle buses, and private employee vehicles traveling to and from the Project Site. All study area roadways currently operating at an acceptable LOS would continue to do so. Because the two segments of Highway 46 already operate at an unacceptable level, additional construction-related traffic would have a temporary, moderate adverse effect on traffic at peak times, but would not degrade the LOS.

TABLE 3-30
STUDY AREA ROADWAYS LEVEL OF SERVICE

ROADWAY SEGMENT	EXISTING AADT	EXISTING DIRECTIONAL PEAK HOURLY VOLUME	DIRECTIONAL PEAK HOURLY VOLUME DURING CONSTRUCTION	EXISTING PEAK LOS[1]	PEAK LOS DURING CONSTRUCTION
Highway 58 west of Bitterwater Road	440	36	121	A	A
Highway 58 east of Bitterwater Road	340	30	36	A	A
Highway 46 west of Bitterwater Road	13,600	768	785	E	E
Highway 46 east of Bitterwater Road	12,100	684	690	D	D
Bitterwater Road between Highway 58 and Highway 46	48	5	28	A	A
La Panza Road between Highway 58 and Creston Road	1,145	64	93	A	A
Creston Road north of Creston Road	3,461	201	215	A	A

AADT – Annual Average Daily Traffic

[1] Peak LOS during Project operation would be the same as the existing peak LOS

Source: Wood Rodgers 2010

Highway 58 east of Bitterwater Road would continue to operate at an acceptable LOS, but implementation of the Topaz Truck Management Plan would mean drivers could experience delays of up to 35 minutes when trucks are being escorted through the TCA, and slightly shorter delays while waiting for a truck escort to begin. Recent traffic counts indicate that approximately 10 vehicles would be subject to delays during each truck escort. The delays would be consistent over the approximately three-year construction period and would have an adverse impact on individual drivers subject to these delays.

A small number of the 11,540 deliveries subject to the Topaz Truck Management Plan would be considered oversized loads and may result in temporary increased traffic delays. The Project Proponent will ensure oversized loads are delivered in accordance with CalTrans regulations.

Aircraft Travel. The Proposed Project would have no impact on air travel. No structures taller than 200 feet are planned; therefore, the Project will comply with FAA Regulations Part 77, Section 77.13(a)(1) and 77.23(a)(2).

Bicycling. The Project Proponent would prohibit construction activities on the day of the annual Wildflower Ride, avoiding impacts on this event.

Operation. Fifteen full-time workers would be employed during operation of the Proposed Project, resulting in 15 round trips per day to and from the Project Site. The addition of 15 round trips would not cause a decrease in LOS on any area roadways. Due to seasonal changes in the amount of daylight each day, workers may be traveling during off-peak times during certain times of year. Highway 46 west would continue to operate at its current LOS E, but it is expected to be widened to a four-lane road in 2016, during the operational phase of the Proposed Project (CalTrans 2009b). Combined with the small number of vehicles needed for Project operation, long-term impacts are anticipated to be negligible.

The proposed Solar Energy Learning Center on the Project Site is designed to be able to accommodate several school class field trips each day and approximately 100 to 200 other visitors monthly. Impacts related to the Solar Energy Learning Center are anticipated to be negligible because the number of trips per days would be small and most of the associated traffic would not occur during peak hours.

Decommissioning. The Project Proponent would decommission the Project at the end of its useful life. Compared to the construction phase, decommissioning would require fewer personnel and vehicles and would occur over a shorter time period. Therefore, traffic impacts during decommissioning would be less than those for construction.

Alternative B: Develop the Topaz Solar Farm in Study Area B

Transportation-related impacts from construction, operation, and decommissioning would be similar to those described under Alternative A. Alternative B may require slightly more daily aggregate-related roundtrips than Alternative A because of the increased grading requirements.

Reconductoring

The PG&E Morro Bay to Midway 230-kV transmission line runs roughly parallel to Highway 58 from the Proposed Project Site to its terminus at the Midway Substation, approximately 2.7 miles west of Interstate 5. Both switching stations would be located north of Highway 58. Reconductoring 35 miles of this line would involve a maximum of 50 employees at any given time during the 20-month work period. For most of its route, the line is set back from public roads and comes within 2,000 feet of Highway 58 only for the easternmost five miles of its route. Work crews would access the transmission line corridor via either Highway 46 to Shell Creek Road to eastbound Highway 58 in San Luis Obispo County or via Highway 33 to Lokern Road or Interstate 5 to westbound Highway 58 in Kern County. Crews would then generally use private access roads to reach the actual reconductoring sites. PG&E would install signs along Highway 58 alerting drivers to the presence of construction-related traffic near the Carrisa Plains Elementary School (San Luis Obispo County 2010a).

Reconductoring activities would briefly close Highway 33 while crews reconductor the overhead line across the highway. Helicopter operations, used to access remote portions of the line, may also require temporary road closures. Due to their short duration, these actions would have a temporary, minor impact on transportation.

Vehicles traveling daily to and from each reconductoring site are estimated at six to eight trucks, including two tractor trailers, and approximately 10 passenger vehicles or pickup trucks. These vehicles would generally access the transmission line from Highway 58, by way of Highway 46, Highway 33, Shell Creek Road, Interstate 5, and Lokern Road. Reconductoring traffic will not alter current LOS standards on area roadways (Wood Rodgers 2010), and transportation impacts related to reconductoring are expected to be minor. Measures to reduce impacts would be similar to those described for the Proposed Project, including developing a Traffic Control Plan to improve safety and awareness of the Project.

No Action Alternative

Under the No Action Alternative, the Project would not be constructed. Temporary adverse transportation impacts along Highway 58 would occur if the CVSR project is constructed.

3.17 INFRASTRUCTURE AND PUBLIC SERVICES

3.17.1 Affected Environment

Regulatory Framework

California Integrated Waste Management Act of 1989
The California Integrated Waste Management Act of 1989 required cities and counties to divert 50 percent of their waste streams by 2000. The act also required the implementation of a Source Reduction and Recycling Element, which mandated counties to demonstrate how they achieved the 50 percent requirement.

California Solid Waste Reuse and Recycling Access Act of 1991
The California Solid Waste Reuse and Recycling Access Act of 1991 requires the development of municipal ordinances governing adequate areas for collection and loading of recyclable materials in development projects.

San Luis Obispo County Land Use Ordinance, Title 22
San Luis Obispo County Land Use Ordinance includes regulations governing trash collection and disposal for new land uses (Article 3, Chapter 22.10, Section 22.10.150), requiring the installation of underground utilities serving new structures (Article 3, Chapter 22.10, Section 22.10.160), and requiring adequate fire agency review and fire safety measures for new development (Article 5, Chapter 22.50, Section 22.50.030).

In addition, the San Luis Obispo County Resource Management System helps the County analyze, avoid, and correct resource deficiencies for water supply, sewage disposal, schools, roads, and air quality. The Annual Resource Summary Report guides decisions about balancing development with the resources necessary to sustain such development (San Luis Obispo County 2009a).

General Project Area
The infrastructure near the Project Site includes paved county and state roads; several unpaved county and private roads; ranches and their associated facilities; electricity transmission and distribution lines; and several rural residences. Surrounding lands are used primarily for agriculture and ranching, or as open space. The services and utilities applicable to Study Area A and Study Area B are the same.

Services
Police Services. The project area is served by the San Luis Obispo County Sheriff's Department, which operates three patrol stations. Average response times are in the 5- to 20-minute range, while longer service requests to outlying county areas can be up to 45 minutes. Poor response times are generally due to the distances involved in serving such a large area (San Luis Obispo County 2009b).

The California Highway Patrol services San Luis Obispo County highways, with stations located in San Luis Obispo and Templeton. They are available to respond in emergency situations but generally do not respond to residential calls.

Fire Services. The California Department of Forestry and Fire Protection (Cal Fire) functions as the San Luis Obispo County Fire Department (SLOCFD) under a contract with San Luis Obispo County. Staffing for the entire county is accomplished by cooperative agreements between Cal Fire, the County of San Luis Obispo, Los Osos and Avila Community Service Districts, and the City of Pismo Beach. Approximately 180 full-time state employees operate the department, supplemented by as many as 100 state seasonal fire fighters, 300 County paid-call and reserve fire fighters, and 120 state inmate fire fighters (SLOCFD 2010).

SLOCFD operates 21 stations, the closest of which is Simmler (Station 42). This station has the largest response area in the county, serving the entire 50-mile stretch of the Carrizo Plain. Simmler is staffed Tuesday through Thursday with a fire captain and fire apparatus engineer. The paid staff is responsible for emergency response and administration and training of 15 paid-call firefighters. Simmler members are dispatched via radio pager to all incidents in Carrizo Plain and are responsible for equipment operation when permanent staff is off duty (SLOCFD 2010). The estimated response time is 10 to 20 minutes (San Luis Obispo County 2009b).

Emergency Medical Services. In addition to Fire Company 42, Simmler is home to Emergency Medical Services 42. Emergency Medical Services 42 is trained in emergency medical situations and serves as the primary emergency care responders during medical emergencies (SLODFC 2010). Private companies based throughout the county also provide ambulance service. Response times are generally poorer in the more rural portions of the county because of the large area being served and the distances involved.

Hospital services are provided by Twin Cities Hospital in Templeton, Arroyo Grande Community Hospital in the city of Arroyo Grande, and French Hospital Medical Center and Sierra-Vista Regional Medical Center in the city of San Luis Obispo. The closest of these facilities is approximately one and a half hours from the Project Site (San Luis Obispo County 2009b).

Schools. San Luis Obispo County is home to nine public school districts. The project area is served by the Atascadero Unified School District, which operates 12 schools. The Carrisa Plains Elementary School is the nearest school, located 2,100 feet from Study Area A and 2,900 feet from Study Area B.

Waste Management. Trash collection and disposal in the county is accomplished by private haulers and individual direct haul to landfills. Illegal dumping, which includes direct on-property disposal, is also present on some of the larger rural

parcels. The County has three permitted public landfill facilities that accept a variety of municipal solid waste. Currently, no private hauler service is available at the Project Site (San Luis Obispo County 2009b).

Utilities

Water and Sewer. There is no water service at the Project Site. The Project Site is also absent sewer service; nearby residences and the Carrisa Plains Elementary School rely on septic systems.

Electricity. Electricity is provided by the PG&E electrical distribution system. PG&E's Morro Bay to Midway 230-kV and Temblor to San Luis Obispo 115-kV transmission lines run through the Project Site.

Natural Gas. Natural gas service is not available at the Project Site.

Telecommunications. AT&T provides land-line telecommunications service.

Reconductoring

Infrastructure, including services and utilities, for the reconductoring area is similar to that for the general project area in San Luis Obispo County. In addition, the following services and utilities are provided in Kern County:

- Kern County Sheriff's Department provides police protection.
- The Kern County Fire Department provides fire protection services. The Buttonwillow, McKittrick, and Wasco fire stations are closest to the transmission line.
- The Kern County Superintendent of Schools operates three elementary school districts and two high schools near the transmission line route.
- Hospital services are located in Bakersfield, approximately 25 miles east of the transmission line.
- PG&E and Southern California Gas Company provide electricity and natural gas service.
- Wastewater service is provided by two water storage districts.
- Two private companies provide waste management.

3.17.2 Environmental Impacts

Infrastructure impacts would be considered substantial if the Proposed Project resulted in one or more of the following:

- Significant increase in population growth, either direct or indirect;
- Significant change in revenue for local businesses or government agencies; or

- Acceptable levels of service for law enforcement, fire protection, schools, hospitals, or solid waste facilities were adversely affected.

Proposed Action

Alternative A: Develop the Topaz Solar Farm in Study Area A

Construction. Construction activities would average 400 workers at a given time, increasing potential risks of construction-related accidents. Motorized equipment and any electrical construction activities would increase the number of potential ignition sources and the risk of fire. These risks would place an increased demand on limited fire protection and safety services during construction. County development impact fees paid by the Project Proponent would allow the nearest fire station, currently staffed three days a week, to attain adequate staffing necessary to respond to emergencies at the Project Site during the construction period. Impact fees would also fund increased police capabilities, mitigating any potential strain on those services. Revenue from these fees is estimated to cover emergency service needs during construction and for several decades thereafter (San Luis Obispo 2010a).

To ensure adequate emergency vehicle access throughout the construction period, prior to approval of construction permits, the Project Proponent will include details on construction plans showing the design features of roads, buildings, and the Project Site. These design features would be reviewed and verified by Cal Fire and the Sheriff's Department to ensure adequacy of access for emergency service providers (see IN-1 in Table 2-9).

Construction would require up to 273 acre-feet of water annually for the first two years, an amount which the Project Proponent would procure on site via existing and new water wells. Because no water or wastewater services are provided in the project area, this would have no impact on those services; the effects on groundwater resources in the project area are discussed in Section 3.7, Water Resources.

Some construction workers may temporarily relocate to communities within commuting distance of the Project Site during construction. Because these workers are likely to be dispersed across eastern San Luis Obispo County and western Kern County, their impact on service and utility providers would be negligible.

Few, if any, children of construction employees are expected to relocate to the project area during construction. Therefore, construction would not increase enrollment levels or impact local schools.

A fiscal analysis prepared for the Proposed Project indicates County property tax revenues for the Project Site would have a beneficial impact on the County's ability to fund essential services.

Based on the indicators listed above, construction of the Proposed Project would not result in substantial adverse impacts on public services or infrastructure.

Operation. The Proposed Project would generate power for operational needs during daylight hours. At night, a small amount of electricity would be needed to power site infrastructure, including the monitoring and maintenance building. This is not expected to have any impact on project area services or utilities.

Approximately 4.5 acre-feet of water annually would be needed for operation of the Proposed Project. The Project Proponent would accommodate this need on site. Because no water or wastewater services are provided in the project area, this would have no impact on those services.

Operation of the Project could result in a minor increase in enrollment levels at local schools. San Luis Obispo County requires an impact fee to be paid for all new developments. The Project Proponent would pay development fees to the Atascadero School District, which, together with increased school revenue from property tax increases, would provide a minor beneficial impact to local schools.

In order to meet state and local solid waste policy objectives, the Project Proponent would recycle at least 50 percent of construction waste and provide supporting documentation. As discussed in Section 3.15, Public Health and Safety and Hazardous Materials and Waste, most damaged or broken modules would be recycled into new modules or other new products. A private hauler or employees would be used to transport waste and other recyclables to the local landfill.

The Project Site is in a high severity risk area for wildland fire. However, the existing grassland vegetation is considered a low-fuel load type of vegetation and is one of the easier vegetation and habitat types to manage or control when fire conditions exist. None of the materials used for the permanent Project components are considered flammable. As a result, once a fire engine is on the scene, containment times of any wildland fire would be substantially reduced (San Luis Obispo County 2009b). On-site vegetation would be managed in an effort to minimize potential for vegetative fuel buildup, and a Wildfire Management Plan (Appendix G) in compliance with County regulations has been prepared for the Project.

County development impact fees paid during construction would adequately fund fire and police services for the anticipated operational lifespan of the Proposed Project. In addition, 24-hour security would be provided by Topaz Solar Farms LLC staff or by qualified contractors to reduce the need for outside emergency response services.

Some risk of vandalism, land use violations, and traffic accidents would be present during construction and operation. Impacts on the Sheriff's Department

would be compounded by the long distance to existing sheriff facilities but are expected to be minor.

Based on the indicators listed above, operation of the Proposed Project would not result in substantial adverse impacts on public services or infrastructure.

Decommissioning. Infrastructure impacts from decommissioning are expected to be similar to those from construction. A discussion of the First Solar PV module collection and recycling program is included in Section 3.15, Public Health and Safety and Hazardous Materials.

Alternative B: Develop the Topaz Solar Farm in Study Area B
Infrastructure impacts from construction, operation, and decommissioning of the proposed Topaz Solar Farm would be the same as described under Alternative A.

Reconductoring
Reconductoring would be accomplished by up to 50 PG&E employees over a 20-month construction period. Workers are not expected to move to the project area from outside the region, meaning it is unlikely that construction or operation would have any impact on school enrollment. Though reconductoring will not increase the risk of fire above current risk levels, PG&E will submit a Fire Prevention and Response Plan to mitigate emergency access impacts. Construction and operation are not expected to result in increased demand for police services.

PG&E would use reclaimed water whenever possible for dust suppression, fire control, and other purposes during construction. Operation is not expected to result in an increase in water consumption over current levels.

PG&E will also abide by the state and local solid waste policy objectives to recycle at least 50 percent of construction waste and provide documentation thereof. Construction and operation are not expected to increase demands on any current services or utilities, and construction would not interrupt electrical service along the line. As such, no impacts are anticipated.

No Action Alternative
Under the no action alternative, the Proposed Project would not be constructed, and there would be no change in existing infrastructure conditions or public service requirements.

3.18 CUMULATIVE IMPACTS

A cumulative impact is defined 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 Part 1508.7).

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

This chapter analyzes the Project's potential cumulative impacts by: (1) defining the geographic areas DOE considered for the cumulative effects analysis; (2) providing an overview of relevant past and present actions in the project vicinity that may affect cumulative impacts; (3) presenting the reasonably foreseeable actions in the geographic area of consideration; and (4) determining whether there are adverse cumulative effects associated with the resource areas analyzed in Sections 3.2 through 3.17.

3.18.1 Geographic Area of Evaluation

The geographic area of evaluation is the spatial boundary in which the cumulative effects analysis was undertaken. The spatial boundary evaluated in this cumulative effects analysis generally includes the Carrizo Plain, as well as the areas extending into western Kern County along transportation corridors that could be affected by the Proposed Project together with past, present, and reasonably foreseeable actions in the region.

The Carrizo Plain was selected as the primary geographic area of evaluation for the cumulative effects analysis because it is geologically bounded by the La Panza Mountain Range to the west and northwest, the Caliente Mountain Range to the south and southwest, and the Temblor Mountain Range to the east. In addition, the northern end of the plain is physically bounded by the convergence of the western foothills of the Temblor Range and the eastern foothills of the La Panza Range. These geological features create a physical boundary that generally confines the potential for cumulative effects to the Carrizo Plain area for many resources. A larger geographic area may be used to analyze cumulative impacts based on a resource's specific temporal or spatial impacts. For example, the socioeconomic cumulative analysis includes most of San Luis Obispo and Kern Counties, as the construction workforce would draw from this wider area. The geographic area of analysis is specified in the discussion of the cumulative impacts for that resource where it differs from the general area of evaluation described above.

3.18.2 Temporal Boundary of Evaluation

A temporal boundary is the timeframe during which the cumulative effects are reasonably expected to occur. The temporal parameters for this cumulative effects analysis are the anticipated lifespan of the Proposed Project, beginning in 2011 and extending out at least 30 years, which is the minimum expected project life of the Proposed Action. Where appropriate, particular focus is paid to near-term cumulative impacts of overlapping construction schedules for proposed projects in the area of evaluation.

3.18.3 Cumulative Actions

Past, present, and reasonably foreseeable actions have been identified based on information provided by San Luis Obispo County in the Draft EIR for the Topaz Project (San Luis Obispo County 2010a) and the Final EIR for the CVSR Project (San Luis Obispo County 2010e) and a search of projects under review by both Kern County and the California Energy Commission. Past, present, and reasonably foreseeable cumulative actions are described below.

As described in Section 3.2, Land Use, past and present actions on private lands in the Carrizo Plain area consist primarily of dry farming and grazing. Because of the lack of water, lands are cropped every two to three years, remaining fallow or growing volunteer crops in the intervening years. Observations of the Project Site indicate that it takes at least five years for cropland to revert to annual grassland.

The Carrizo Plain area contains scattered rural residences. The community of California Valley, located a few miles south of the Topaz Project Site, is the closest community. California Valley is a relatively undeveloped village with a small number of residents and limited commercial development. There are no industrial developments in the Carrizo Plain area. Utilities in the area include the existing Morro Bay to Midway 230-kV transmission line running in an east-west direction through the proposed Topaz Project Site and the parallel Temblor to San Luis Obispo 115-kV transmission line, as well as PG&E distribution system lines. There are no railroads in the vicinity, and limited road access. There is a small airstrip in California Valley.

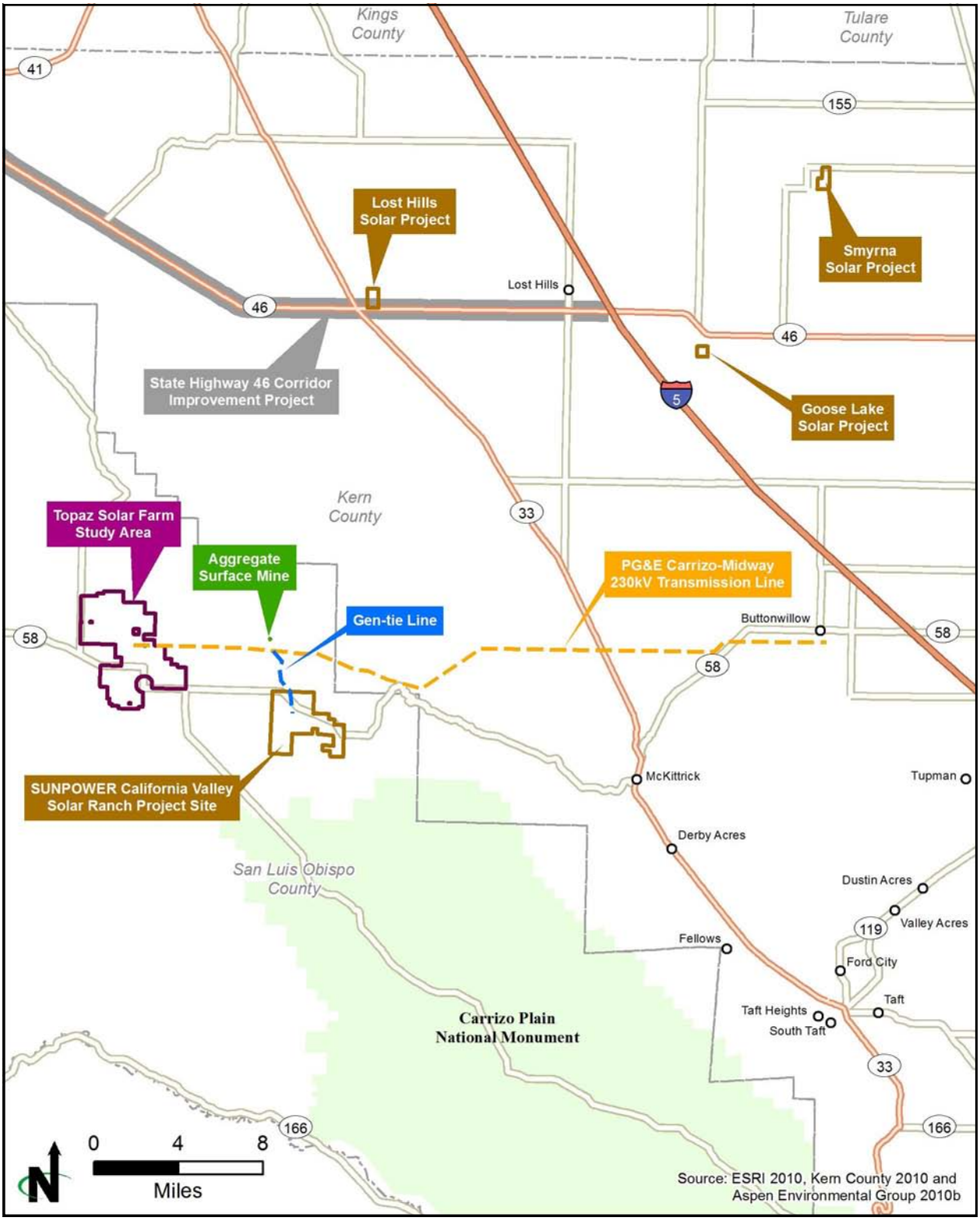
Federal land uses in the project area include the Carrizo Plain National Monument, located approximately six miles southeast of the Topaz Project Site in the southern portion of the Carrizo Plain. This 250,000-acre area, managed by the BLM, is noted for its geologic features such as the San Andreas Fault and Soda Lake, archeological sites such as Painted Rock, and wildlife and other natural resources. Approximately 87,000 people visited the monument in 2007, and use rates are expected to increase at a moderate rate into the future (BLM 2010a).

Projects in the cumulative impacts area of evaluation include solar projects in the Carrizo Plain and western Kern County, transmission-related projects to accommodate solar development, and road improvement projects (**Table 3-31**, Reasonably Foreseeable Actions, and shown on **Figure 3-22**, Cumulative Projects). The projects shown on Table 3-31 are those that would have the potential for cumulative impacts on the majority of the resources discussed in this section.

TABLE 3-31
CUMULATIVE PROJECTS

PROJECT	LOCATION AND DESCRIPTION	STATUS	DATE
Topaz Solar Farm (Topaz Solar Farms, LLC)	550-MW PV facility located on approximately 4,000 acres.	Under review by the County in the EIR process.	Construction would begin in late 2011 and would take 3 years.
CVSR (SunPower)	250-MW PV facility located approximately five miles east of the Topaz site on 2,000 acres. Includes 2.8 miles of gen-tie line.	Under review by the County in the EIR process.	Construction would begin in mid-2011 and would take 3 years.
Aggregate Surface Mine	Approximately 5 miles east of the Topaz site on 23 acres north of the CVSR.	Existing 9.6-acre borrow pit; expansion is under environmental review by the County.	Currently in use.
Lost Hills Solar Project (Next Light)	A 20-MW and a 12.5-MW PV solar facility on 307 acres near the intersection of Highway 33 and Highway 46 in Kern County.	Approved by Kern County.	Construction would begin in the first half of 2011.
Goose Lake and Smyrna Solar Projects (enXco)	15-MW PV solar facility on 94 acres south of Highway 46 and east of Interstate 5 in Kern County and 20-MW facility on 125 acres north of Highway 4 and east of Interstate 5 in Kern County.	Under review by Kern County in the EIR process.	Construction would begin no earlier than mid to late 2011 and would take 8 to 10 months per site.
PG&E Reconductoring of Morro Bay to Midway Line	35-mile reconductoring upgrade between a new switching station on the Project Site and the Midway substation. Includes mainly stringing of additional lines on existing towers, with some tower replacement.	An application will be filed with the CPUC after County environmental review process is complete.	Construction would begin in mid-2011 and would take approximately 20 months.
State Highway 46 Corridor Improvement Project	Widening of Highway 46 from two to four lanes between Geneseo Road in Paso Robles and Interstate 5 in phase over multiple years.	Construction in 2011 beginning with Geneseo Road to Almond Drive segment.	Construction within San Luis Obispo County is expected to begin after 2016.

Source: San Luis Obispo County 2010a, 2010e; Kern County 2011; CEC 2011.



The projects depicted on this figure, except for the Highway 46 project, could have overlapping construction periods.

Cumulative Projects

Topaz Solar Farm
San Luis Obispo County, CA

Figure 3-22

In addition to the specific projects listed in Table 3-31, there are numerous solar projects that have been proposed or approved on federal, state, and private lands throughout California, including the Central Valley and Desert regions of the state. For example, a number of small (5 to 20 MW), mid-size (75 to 150 MW), and large (one 700-MW solar complex in southwestern Kern County and one 650-MW facility in southeastern Kern County) solar facilities have been proposed in Kern County, east of the area of evaluation for the proposed Topaz Project. While these proposed solar facilities would not have cumulative effects on the majority of the resources discussed in this section because of their distance from the Topaz Project Site, these proposals do have the potential for beneficial or adverse cumulative effects on air quality and socioeconomics and are discussed in those resource sections, below.

In addition to the solar projects proposed in Kern County and other Central Valley and Desert locations, a 420-MW solar facility, Panoche Valley Solar Farm, has been proposed in San Benito County, approximately 100 miles northwest of the Topaz Project. This project is also outside the area of evaluation considered for the majority of resources in the cumulative analysis due to its distance from the Topaz Project Site; however, it does have the potential for adverse or beneficial cumulative effects on land use (lands under Williamson Act contract), air quality, and biological resources and is discussed in those sections, below.

3.18.4 Cumulative Impact Analysis

The cumulative impact analysis for each resource area is provided below. The analysis describes the intensity, or severity, of the cumulative effects, including the magnitude, geographic extent, duration, and frequency of the effects. The magnitude of the effect reflects the relative size or amount of the effect; the geographic extent considers how widespread the effect may be; and the duration and frequency refer to whether the effect is a one-time event, intermittent, or chronic. Cumulative effects of past, present, and reasonably foreseeable projects combined with development of the Topaz Solar Farm Project under either alternative are discussed below.

Land Use

The proposed Topaz solar facility and other reasonably foreseeable projects would be required to comply with all adopted land use plans and zoning requirements. Therefore, any such projects would be generally consistent with the overall land use policies of San Luis Obispo County and Kern County and would not result in any cumulative effects that would be incompatible with existing or long-term land use plans.

The NRCS land evaluation indicates that the proposed Topaz Project would convert a maximum of 2.8 percent of farmable lands in San Luis Obispo County under Alternative A and 2.3 percent of farmable lands under Alternative B (NRCS 2010). The proposed Topaz Solar Farm and CVSR projects together would affect a maximum of 10,900 acres of land, or 4 percent of farmable lands in the county. None of the lands that would be affected are irrigated and are

therefore not considered prime farmland. In addition, as not all of these lands would be developed as part of the solar facilities, the actual acreage removed from agricultural use may be less. Lands affected are currently used for dry farming, for grazing, or are not used for agricultural purposes and have converted to nonnative annual grasslands.

The proposed Topaz and Panoche solar projects each have the potential to affect lands under Williamson Act contract. Study Area B of the Topaz Project Site contains approximately 1,795 acres of land under Williamson Act contract, while the Panoche Valley Solar Farm would affect nearly 7,000 acres under Williamson Act contract. Cancellation of these contracts would have a cumulatively adverse effect by removing these lands from protected agricultural use; however, mitigation to compensate for loss of Williamson Act lands would establish permanent conservation easements at ratios determined by the counties in which the projects were located, offsetting the impact related to cancellation of Williamson Act contracts.

The proposed reconductoring of the 230-kV transmission line would occur within an existing utility corridor and would not permanently affect farmland or grazing. Therefore, no cumulatively considerable impacts on farmlands would be anticipated with implementation of this action.

The proposed energy projects within the Carrizo Plain would have cumulative adverse impacts by altering the character of the area through the introduction of industrial elements into the rural environment. This change would be most striking during the overlapping construction periods, when heavy equipment use and project-related traffic would dominate the immediate landscape. Cumulative construction impacts are discussed under applicable resource areas, below.

Temporary adverse impacts on recreation would occur if project-related construction substantially increased the length of time it took visitors to reach the Carrizo Plain National Monument. However, because any such impacts would be temporary, there would be no cumulatively considerable adverse impacts to recreational use as a result of the Project.

Visual Resources

The cumulative analysis for visual resources considers impacts on local sensitive receptors, generally within five miles of the proposed Topaz site, as well as the impact on the visual character of the Carrizo Plain as a whole. The cumulative analysis considers existing structures and natural features of the landscape along with planned features of the other reasonably foreseeable projects.

As described in Section 3.3, Visual Resources, there has been minimal development of the landscape surrounding the proposed Topaz site. This rural character extends eastward along the transmission line and around the proposed CVSR project site. Three high-voltage power lines cross the Carrizo Plain, including the Morro Bay to Midway 230-kV transmission line. The towers

associated with these lines are visible, vertical elements. Other existing structures include distribution lines on wooden poles, rural residences, including farms and ranches with their associated fencing, dirt lanes, outbuildings, and farm equipment.

The proposed Topaz Solar Farm would have an adverse visual impact on the foreground viewshed of some local residents, as discussed in Section 3.3. Because other proposed projects would not be visible in the immediate viewshed, these projects would not increase the level of this impact. There would thus not be a cumulatively adverse impact to the foreground viewshed.

The CVSR project and reconductoring, together with the proposed Topaz facility, would cumulatively alter the visual character of the Carrizo Plain. The numerous PV arrays and other structures would introduce visual elements that are in sharp contrast to the current rural character of the area. This cumulative effect would be greatest under Alternative A, which lies on both sides of Highway 58. Highway 58 is the primary vantage point through the plain, and the proposed Topaz and CVSR solar projects and the reconductoring project would be visible from the highway at some point, though not at the same time. Alternative B would have less of a cumulative effect, as the proposed Topaz Project would be primarily north of Highway 58 in contrast to Alternative A.

The proposed aggregate mine project would not be visible from major public vantage points, though mining and hauling would create dust that could be visible from Highway 58. A dust control plan similar to the one described for the Proposed Project would be implemented to avoid dust nuisance conditions associated with the aggregate mine.

The proposed CVSR PV arrays would be visible in the far background views from the Carrizo Plain National Monument. Other proposed actions, including the proposed Topaz Solar Farm Project, would not be visible from the Monument due to distance, elevation, or topography. However, all proposed projects except the aggregate mine would be visible from routes to the monument, resulting in a potentially adverse cumulative impact.

Proposed solar projects in Kern County would be visible from alternate roadways than the Topaz Project and would thus not have a cumulative visual impact.

Air Quality

Air pollution control districts manage attainment of criteria pollutant standards by adopting rules, regulations, and attainment plans, which comprise a programmatic approach to attainment of federal and state air quality standards. This approach accounts for the fact that projects on an individual basis rarely affect air quality designations; rather, the cumulative effect of many projects as well as local meteorological conditions are among the factors that determine the air quality of a region. The San Luis Obispo County APCD manages air

quality in San Luis Obispo County, while the San Joaquin Valley APCD manages air quality in a multi-county area, including western Kern County. Therefore, the area of evaluation for criteria air pollutants includes both San Luis Obispo County and the portion of Kern County managed by the San Joaquin Valley APCD.

Potential cumulative air quality impacts from localized exhaust and fugitive dust emissions during construction are analyzed for those projects described in Table 3-31; solar projects in a larger area of evaluation are considered for analysis of cumulative greenhouse gas emissions and climate change. There are no major stationary sources in the project area, nor would there be major sources associated with the proposed projects listed in Table 3-31.

The Topaz and CVSR projects, a portion of the Morro Bay to Midway transmission line route, and the aggregate mine would occur in San Luis Obispo County, which is in attainment for all national ambient air quality standards. The remainder of the projects would occur in eastern Kern County, which is an extreme ozone nonattainment area and a $PM_{2.5}$ nonattainment area. The primary potential adverse cumulative effects would be emissions associated with construction of the projects listed in Table 3-31. Some portion of the construction phase of each project may overlap, with emission-producing sources on the project sites as well as construction-related traffic on area roadways. Construction activities would result in the production of ozone precursor emissions, fugitive dust, and greenhouse gas emissions during construction. These potentially substantial cumulative impacts would be reduced to moderate levels through the implementation of standard exhaust emission controls and fugitive dust controls that would be required for each project individually. Operation of the proposed projects would have minimal air quality impacts.

Operation of the proposed solar facilities listed on Table 3-31 as well as other solar facilities proposed throughout the Central Valley and Desert regions of California would have a cumulatively beneficial impact on air quality from the potential reduction in emissions from more intensive electricity generation facilities. By potentially displacing the use of natural gas and other fossil fuels to produce electricity, the proposed solar projects could contribute to long-term beneficial cumulative effects on air resources, specifically the reduced generation of CO_2 and other greenhouse gases.

Noise

Since noise dissipates with distance, the area of evaluation for cumulative noise impacts is more limited than for other resources. For this analysis, noise impacts are considered for areas within one mile of a noise source. Because individual project sites are generally at a greater distance than one mile from each other, no cumulative noise impacts would result from construction or operation that occurred on each project site.

While proposed projects are separated by a distance such that on-site construction noise levels would not have a cumulative effect, delivery truck and employee traffic routes could overlap and would raise the noise levels along area roadways, particularly along Highway 58, for the duration of construction, possibly in excess of San Luis Obispo and Kern County noise standards. This would pose a moderate impact on these receptors that would cease once construction is complete. The aggregate mine would not contribute to increased noise levels at any sensitive receptor sites, as the nearest residences are 2.75 miles from the mine and over one-half mile from the haul routes.

PV equipment and transmission lines do not produce noise; therefore, there would be no cumulative noise impacts associated with operation of these facilities. Noise from vehicle and maintenance equipment would not produce a cumulative noise impact given the distance between facilities and low levels of noise produced.

Geology and Soils

The proposed Topaz project and other reasonably foreseeable actions have the potential for increasing erosion associated with earth-disturbing actions. Triggering or acceleration of erosion or slope failures would be limited to the areas within and adjacent to the boundaries of individual projects. Generally, geologic materials, minerals, and soils occur at specific locales and are unaffected by activities not acting on them directly. In order to be cumulatively considerable, such conditions usually would have to occur at the same time and in the same location as the Proposed Project. However, where multiple projects would occur at the same time within a watershed, they have the potential to have a cumulatively significant impact on the watershed (see Water Resources discussion, below). All projects would be subject to County, Regional Water Quality Control Board, or California Public Utilities Commission requirements for erosion controls and use of best management practices to prevent erosion and sedimentation. Therefore, proposed project impacts are not likely to be cumulatively significant.

Seismic impacts (ground shaking, earthquake induced ground failure, and fault rupture) from the numerous local and regional faults could result in an impact on individual projects. Strong to severe ground shaking may occur at the project sites during the life of the projects and could result in collapse of structures and the potential for transmission line damage, damage to nearby roads or structures, and possibly injury or death. Past and future projects located in close proximity to existing structures would be exposed to the same conditions and therefore the same impacts. However, compliance of building design with the California Building Code and compliance of transmission lines with CPUC design specifications would minimize risks to the listed cumulative projects.

Water Resources

Surface Waters

The region of analysis for surface water resources occurs at a watershed level. The loss of wetlands and Other Waters of the US has occurred throughout the watershed; ongoing farming, infrastructure development, petroleum and mineral extraction, and residential development have contributed to the loss and degradation of surface waters. Large-scale solar development proposed by the Topaz Solar Farm and CVSR projects, as well as smaller projects, could contribute to this loss. However, because the Topaz Solar Farm Project would not impact wetlands, it would not contribute to cumulative wetlands impacts. Additionally, the impact on other Waters of the US is very small–access roads or utility crossings would impact less than one acre of ephemeral drainages under either alternative–and this impact would be mitigated. Permanent Project impacts to these other Waters of the US would be mitigated by creating waters within a portion of the main ephemeral drainage at a 2:1 mitigation-to-impact ratio and ensure that no loss of acreage, function, or associated services would occur. The Project would therefore not have cumulatively significant impacts on surface water quality.

Surface Water Quality

Cumulative adverse effects on surface water quality from the proposed projects would be minimized through erosion control measures and SWPPPs required for each action individually. Restoration of natural drainage features and upland grassland habitat through removal of land from active farming would have a beneficial effect on surface water quality in terms of erosion control, sediment reduction, and wildlife habitat functions.

Groundwater

The area of evaluation for groundwater is the Carrizo Plain groundwater basin, which encompasses approximately 270 square miles within San Luis Obispo County. This area is located within California Valley Water Planning Area (#8). Because the Topaz Solar Farm Project would not result in long-term lowering of the groundwater levels, it would not contribute to cumulative impacts on groundwater in the basin.

The San Joaquin Valley Groundwater Basin would also be part of the area of evaluation because a portion of the transmission line reconductoring would be within this basin. Minimal groundwater would be required during reconductoring; therefore, it would not contribute to cumulative impacts on groundwater in the basin.

Biological Resources

The geographic region for the analysis of cumulative impacts related to biological resources includes the Carrizo Plain and surrounding areas (including the Carrizo Plain National Monument) in San Luis Obispo County, the Panoche Valley in San Benito County, and portions of the San Joaquin Valley. These areas

all contain habitat and vegetation for many of the wildlife and special status species that would be impacted by the proposed projects and are either proposed for or currently subject to land use changes that affect these species. Habitat within the region supports core populations of listed wildlife, including San Joaquin kit fox, giant kangaroo rat, and blunt-nosed leopard lizard; however, giant kangaroo rat and blunt-nosed leopard lizard were not found on the Topaz Project Site (USFWS 1998, Althouse and Meade 2010a).

Grassland habitats within the Carrizo Plain provide some of the largest remaining contiguous habitats for many endangered, threatened, and rare species in the San Joaquin Valley (BLM 2010a). Over the past 150 years, many of the original natural communities in the San Joaquin Valley have been destroyed largely due to conversion of grassland to agriculture. This loss of natural communities both in the San Joaquin Valley and Carrizo Plain has been exacerbated through ongoing infrastructure development, petroleum and mineral extraction, spread of exotic plant species, and altered fire ecology. As a result, many of the species that occur in the region of influence are now limited to a fraction of their historical ranges.

Large-scale solar development represents a significant potential source of additional habitat loss for special status species that inhabit the Carrizo Plain. In addition to the Topaz Solar Farm, the 1,900-acre CVSR would involve large-scale conversion of natural and agricultural lands. Together these projects would convert approximately 2.4 percent of the natural lands in the Carrizo Plain ecoregion to developed uses.

Development of these projects would limit the use of the land for foraging, breeding, or wintering for many resident and migratory bird species. Many species of wildlife, including various mammals and foraging raptors, require broad expanses of open land for foraging. Development and intensive agricultural practices currently restrict access to foraging areas for these species, and solar development would exacerbate these impacts. Implementation of mitigation measures for each project would reduce impacts.

This loss of habitat could also impact wildlife linkages and movement corridors, particularly for San Joaquin kit fox, tule elk, and pronghorn antelope. In addition to the direct habitat loss in the Carrizo Plain, the installation of barbed wire livestock fencing over time has excluded some wildlife, such as big game, from available forage areas and acts as a barrier to movement. As development and road expansion continues in the region, it will become progressively more difficult to maintain critical landscape features required for the passage of native wildlife between the Carrizo Plain and Cholame Valley to the northwest.

In the project region, wildlife permeability differs at the proposed Topaz and CVSR solar sites. The Topaz site ranges from medium-high to high permeability for kit fox and pronghorn antelope, and from low to medium-high for tule elk

(Penrod et al. 2010). As proposed, these two solar projects proposed to be located in the Carrizo Plain could reduce an existing corridor available to wildlife by 50 percent, nearly bisecting the Carrizo Plain into a north and south section (Penrod et al. 2010). For pronghorn antelope, the combined projects would result in a substantial reduction in available habitat in this portion of the Carrizo Plain, and the pronghorn subherds that currently utilize the areas proposed to be fenced would be displaced. Impacts on tule elk from the Topaz Solar Farm Project would be minor, as most of the Project Site is not utilized by tule elk. However, implementation of Alternative B would displace some tule elk from the area, as described in Section 3.9, Wildlife.

The USFWS recovery plan for San Joaquin kit fox determined that it was important to protect and enhance corridors for the movement of kit foxes from the Salinas Valley to the Carrizo Plain and San Joaquin Valley (USFWS 1998). Both solar projects in the Carrizo Plain are found in high permeability areas for San Joaquin kit fox, and implementation of the projects could present new barriers to movement. If constructed, the two solar projects would be expected to restrict pathways through the solar arrays but would not completely eliminate movement, due to project design features and other applicant-proposed measures, including permeable fences. It is unknown to what degree San Joaquin kit fox would use the solar arrays for movement or foraging. The Panoche Valley Solar Farm could substantially affect the movement patterns of another core San Joaquin kit fox population. These cumulative impacts have the potential to substantially reduce the size of movement corridors and alter the movement patterns of San Joaquin kit fox. Implementation of mitigation measures would reduce these impacts, and some residual use of the site would likely occur.

Mitigation measures to reduce cumulative impacts on vegetation, wildlife, and special status species are the same as those described in their respective sections in Chapter 3.

Cultural Resources

The geographic scope of the cumulative analysis for cultural resources is defined as the Carrizo Plain and the southern San Joaquin Valley. These areas could have similar cultural resources and a similar site density as described for the proposed Topaz Project in Section 3.11. This is due to the intermittent, seasonal availability of animal, plant, and water resources in the region. Due to the intermittent natural resources, no permanent prehistoric settlements were apparently established in these areas, and shared-use between separate hunter-gatherer language-family groups (the Salinan, Chumash, and Yokuts) was maintained. As noted in the affected environment section of this EIS, the prehistoric, ethnographic, and historic information has revealed a long history of occupancy and use by humans, resulting in the existence of a wide variety of known archaeological and historic properties and isolates. Overall, the Carrizo

Plain and eastern Kern County can be characterized as sensitive for prehistoric and historic resources.

The proposed solar projects and other ground-disturbing activities could have direct impacts on known and unknown cultural resources, including damaging, destroying, and/or displacing artifacts and features. Indirect impacts could result from introducing visual, atmospheric, or audible elements that diminish the integrity of the property's historic features. The potential for undiscovered buried cultural resources and/or human remains exists on all reasonably foreseeable future project sites and for continuing operations and maintenance of existing projects despite previous archaeological surveys and investigations. The cumulative analysis area is considered sensitive for cultural resources due to the depositional environment's potential for burying cultural materials. Construction activities could directly impact undiscovered cultural resources and/or human remains by exposing buried material during construction, resulting in inadvertent artifact destruction or loss of scientific context. Mitigation measures required for projects on an individual basis, as developed through Section 106 permitting for projects with a federal purview and state and county permitting for other projects, would minimize the potential for cumulative effects associated with the actions described in Table 3-31.

Paleontological Resources

The proposed solar development projects and other ground-disturbing activities are likely to have direct and indirect impacts on known and unknown paleontological resources, including damaging, destroying, and displacing fossils, and possible illicit collection by site workers. The increased number of people in the vicinity of the project areas could result in the potential for increased unauthorized collection of fossils and other paleontological resources. As more projects are proposed, processed, and built, permitting agencies will likely continue to require paleontological resource surveys; more fossil localities could be discovered, exposed, and recorded. The increase in knowledge base could contribute to an increase in data to be analyzed and an eventual understanding of the paleontological history of the region.

Socioeconomics

The area of evaluation for cumulative socioeconomic impacts includes San Luis Obispo and Kern Counties, from which the construction labor workforce for the projects identified in Table 3-31 is expected to be drawn. The PG&E Reconductoring Project, the construction of the proposed CVSR, and solar projects throughout Kern County could take place in the same timeframe as the Topaz Solar Farm Project. This would result in a temporary demand for workers to be recruited from within San Luis Obispo and Kern Counties. The combined construction workforce required for projects identified in Table 3-31 and other solar projects in western Kern County whose construction schedules overlapped with the Topaz project account for at least five percent of the construction labor force in the region. Such a substantial demand for jobs would

have beneficial impacts on employment by inducing a decrease in unemployment rates within the region.

A small but unknown percentage of the construction workers for the Topaz Solar Farm Project and up to 187 construction workers for the CVSR would require temporary housing accommodations (San Luis Obispo County 2010a). Though the region's vacancy rate and availability of temporary lodging indicate that temporary housing would be available for the construction workforce, such estimates do not account for temporary housing demands by travelers and seasonal residents. Though a Temporary Construction Worker Accommodations Area (TCWAA) has been proposed for the CVSR project, the TCWAA would still not meet the housing need of approximately 50 of the construction workers for the CVSR project (San Luis Obispo County 2010a). This in addition to the number of temporary housing that may be required for the construction workforce of the proposed Topaz Solar Farm may have cumulative yet temporary impacts on the housing supply in the region. Additional mitigation measures required for permitting of the CVSR (San Luis Obispo County 2010e), and similar mitigation likely to be required by the County for the proposed Topaz Solar Farm Project would minimize impacts related to temporary housing requirements.

As only a small number of the workforce in San Luis Obispo and Kern Counties would be recruited for the operation of the proposed Topaz Solar Farm and the reasonably foreseeable proposed projects, cumulative impacts on employment and housing, due to operation of these projects, would be negligible.

Environmental Justice

While minority and low-income populations have been identified in census tract 45 in Kern County, no adverse cumulative impacts on these populations are anticipated from the proposed and reasonably foreseeable projects. This is due to the fact that census tract 45 is beyond the distance at which potential construction effects could be felt. On the other hand, the construction and operation of these projects would induce jobs in the area. This may benefit the minority and low-income populations through direct employment or indirect positive effects on the local economy.

Public Health and Safety/Hazardous Materials

The area of evaluation for hazardous materials includes the proposed project sites and the transportation routes along which construction supplies and equipment would travel. A second area of evaluation includes the groundwater basins described above in the *Water Resources* cumulative effects section that would have the potential to be affected by accidental spills or leaks from equipment used in those areas. The proposed Topaz Project, combined with all other identified reasonably foreseeable actions, would result in potential cumulative impacts related to a potential increased risk of soil and groundwater contamination associated with spills or leaks. Mitigation measures that would be

in place to minimize or avoid such impacts on an individual project basis would reduce the level of the potential cumulative effects as well.

The reasonably foreseeable future actions identified in Table 3-31 would result in an increase in human presence in the Carrizo Plain area and western Kern County. The Proposed Action, combined with all other identified reasonably foreseeable actions, would result in potential cumulative impact related to a potential increased risk of wildland fires. Although the characteristics of the Carrizo Plain present only a moderate fire hazard (with Temblor Range areas presenting a very high fire hazard), during extreme weather conditions a grass fire originating at any of the cumulative project sites could spread and pose a risk to persons and property on the Carrizo Plain or in the Temblor Range. Measures to reduce the risk of fire resulting from individual projects would reduce the level of the potential cumulative effects as well.

Similarly, measures to reduce the risk of Valley Fever infection identified for individual projects would reduce the risk of cumulative impacts related to disease vectors such as Valley Fever.

Transportation

The area of evaluation for transportation includes the regional road network described in Section 3.16, including Highway 58, Highway 46, and other roads surrounding the proposed project sites. Other projects in this area include the proposed CVSR project, the Morro Bay to Midway transmission line reconductoring proposed by PG&E, and solar projects proposed along Highway 46 in Kern County. Construction time periods for these projects would partially overlap with the proposed Topaz Solar Farm, and construction workers are expected to use the same roads to access their work sites.

Anticipated cumulative traffic loads were calculated in the Draft EIR (San Luis Obispo 2010a) to quantify changes in LOS resulting from cumulative projects in the region. As displayed in **Table 3-32**, Cumulative Traffic Impacts, Highway 46 would continue to operate at an unacceptable LOS, a moderate impact. However, these projects' contribution to the unacceptable LOS would be temporary, lasting during an overlapping three-year construction period for each project. In addition, widening of Highway 46 as proposed by CalTrans would increase the LOS for that roadway.

While cumulative traffic impacts would lessen or cease after construction of reasonably foreseeable actions is complete, cumulative traffic impacts to individual motorists during the construction period would occur along Highway 58 during implementation of the Truck Management Plan for both the Topaz and CVSR Projects by requiring substantial wait times for individual drivers to traverse the truck management areas during times when the Truck Management Plan is in effect.

TABLE 3-32
CUMULATIVE TRAFFIC IMPACTS

ROADWAY SEGMENT	EXISTING ANNUAL AVERAGE DAILY TRAFFIC	EXISTING DIRECTIONAL PEAK HOURLY VOLUME	DIRECTIONAL PEAK HOURLY VOLUME - CONSTRUCTION	EXISTING PEAK LOS	PEAK LOS - CONSTRUCTION
SR 58 west of Bitterwater Road	440	36	368	A	A
SR 58 east of Bitterwater Road	340	30	53	A	A
SR 46 west of Bitterwater Road	13,600	768	835	E	E
SR 46 east of Bitterwater Road	12,100	684	707	D	D
Bitterwater Road between SR 58 and SR 46	48	5	119	A	A
La Panza Road between SR 58 and Creston Road	1,145	64	156	A	A
Creston Road north of Creston Road	3,461	201	244	A	A

Infrastructure

The area of evaluation for cumulative infrastructure impacts includes San Luis Obispo County and western Kern County. The CVSR and Topaz Projects would cumulatively contribute to demands on public staffing for emergency services, including fire and police protection, during the overlapping three-year construction period. County development impact fees and revenue generated through increased property taxes from both projects are expected to be sufficient to cover increased demands for these services. Other reasonably foreseeable projects in Kern County would create a much lower demand for services during project construction and would not be expected to place a cumulative burden on emergency service providers in Kern County.

School enrollments are expected to rise only very slightly, but school impact fees and property taxes would provide a minor cumulative benefit to local schools.

Reasonably foreseeable projects described in Table 3-31 would contribute solid waste to local landfills, but the cumulative amount of waste is not anticipated to require the development of a new solid waste facility. The statutory requirement to recycle at least 50 percent of construction waste would mitigate impacts on local landfills, creating only a minor cumulative impact. The Proposed Project would not generate substantial amounts of hazardous waste; therefore, the capacities of hazardous waste disposal facilities would not be affected.

CHAPTER 4
OTHER REQUIRED CONSIDERATIONS

This section describes unavoidable adverse environmental impacts, irreversible and irretrievable commitments of resources, and the relationship between short-term uses of the environment and long-term productivity. The potential for growth-inducing effects is also discussed.

4.1 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Unavoidable adverse environmental impacts are impacts that would occur after implementation of all feasible mitigation measures. The environmental impacts of the Proposed Project are described in Chapter 3. The analysis has identified impacts that are unavoidable adverse environmental impacts, as summarized below. These impacts, while adverse, are not considered substantial after implementing environmental protection measures described in Table 2-9 and additional mitigations described in Chapter 3.

Construction

Construction of the solar facility in Study Area A or Study Area B would result in land disturbance, visual impacts, generation of fugitive dust and noise, soil erosion potential, consumption of utilities and natural resources, and increased vehicle traffic that would be unavoidable, even with the application of best management practices and environmental protection measures. These activities would occur adjacent to residential, agricultural, and Carrisa Plains Elementary School land uses. Construction activities on the Project Site would be temporary and intermittent as construction progresses across the site; however, traffic-related impacts along haul routes would be steady during much of the three-year construction period.

Water required for construction would result in temporary drawdown of Project Site wells during summer months. The presence of temporary construction parking and staging areas could result in localized redirection of natural groundwater recharge, though runoff would largely be redirected to ephemeral drainages, where percolation may be greater.

Construction activities, heavy equipment, and vehicle use on site during construction potentially could cause mortality or injury to a variety of wildlife species, especially slower-moving species, small animals, species that have subsurface burrows, or ground- or shrub-nesting birds. Construction could also cause short-term visual and noise disturbance to wildlife from construction activities, human presence, vehicles on site, and night lighting. In addition, construction could have short-term adverse impacts on special status species found at the Project Site, though impacts would be minimized through measures developed in consultation with USFWS.

Construction activities could disturb previously undiscovered cultural resources and/or human remains by exposing buried material during construction, resulting in inadvertent artifact destruction or loss of scientific context. Similarly, there is a potential for construction activities to directly impact undiscovered paleontological resources in small areas of fossil-bearing geologic formations with high sensitivity.

Temporary adverse construction impacts from the PG&E Reconductoring Project would be similar to those described above for generation of fugitive dust and noise but would occur over a smaller area and for a shorter duration.

Operation

The presence of the solar facility would convert up to 4,100 acres of land from agriculture to a non-agricultural use and would alter the rural and agricultural character of the immediate project area from the presence of PV arrays, fencing, electrical collection equipment, overhead lines, switching station, substation, and buildings. After implementing setbacks and buffer zones from roads and residences, the Project would result in a moderate to high degree of contrast in foreground views to the existing rural, undeveloped nature of the Project Site and to the surrounding landscape near the Project Site. Overall, development of the Proposed Project would have moderate adverse visual impacts, although highly sensitive persons viewing the facility from nearby locations may experience a higher visual impact.

Operation of the facility could have adverse impacts on wildlife. All of these potentially adverse impacts would be mitigated through environmental protection measures and mitigation measures, though some minor adverse impacts may remain after mitigation. Lighting and noise from operation of the substation and switching station could affect wildlife behavior and physiology, and could cause wildlife to avoid the substation, switching station, and up to a short distance from those areas, over the long term. Project features could also displace populations and affect the movement of wildlife through the area, particularly mammals such as tule elk, pronghorn antelope, and kit fox. The Alternative A Project development area would permanently displace the local pronghorn antelope group from up to 4,100 acres of the Project Site; Alternative B would permanently displace approximately 80 elk from 1,215 acres of foraging habitat within the proposed fenced portion of Alternative B

and would permanently displace pronghorn antelope from up to 4,000 acres. The Proposed Project would reduce the amount of open land available to some wildlife species for long-range movements into and out of the northern Carrizo Plain. Habitat loss, fragmentation, and degradation (e.g., weed invasion, changes to the hydrologic regime) caused by the Project (e.g., PV arrays, fencing, distribution lines) could displace wildlife from the Project Site over the long term, preventing them from using the site for foraging, breeding, wintering, and shelter.

Potential adverse impacts on special status species during operation could occur to kit fox from the fencing of array areas. Movement opportunity around and through the Proposed Project would continue to be present after the Project is built, and open space areas on site would have improvements to enhance kit fox movement and survival. However, it is unknown how much the kit fox would utilize the site after the Project is built.

The PG&E Reconductoring Project would have no adverse impacts above baseline conditions from operation of the reconductored transmission line.

Decommissioning

Decommissioning would have temporary adverse impacts similar to, but lesser in degree than, construction. Upon decommissioning, the Project Site could revert to former uses.

4.2 THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

This section compares the potential temporary effects of the Proposed Action analyzed in this EIS on the environment with the potential effects on its long-term productivity. DOE must consider the degree to which the Proposed Action or alternatives would sacrifice a resource value that might benefit the environment in the long term, for some temporary value to the Project Proponent or the public.

Implementation of the Proposed Action would require the use of environmental resources for construction, operation, and maintenance of the PV arrays, substation, switching station, access roads, inverters, monitoring and maintenance facility, Solar Energy Learning Center, and the collection lines. Construction-related surface disturbance would occur for temporary staging and parking areas, building foundations, and some site preparation in areas of steep grade. Effects from these activities include soil disturbance, increased erosion potential, water use, vehicle and equipment emissions, fugitive dust, and habitat disturbance. Measures would be employed to minimize disturbances and reclaim or improve vegetation cover, soil, and wildlife habitat on these lands. While the degree of reclamation is unknown, to the extent that disturbances can be reclaimed, other productive use of these lands would not be precluded in the long term. Regional economies could be expected to experience

temporary benefits from Project-related expenditures and employment opportunities during construction.

Where undeveloped land is used for facilities, most other productive uses would be precluded. Some grazing uses could continue within the Project Site. There would be some loss of existing vegetation, soil, and quality of habitat available for wildlife, but most of the Project Site has vegetation cover and habitat that is common to the region, so the Project would not result in the loss of rare resources. The placement of PV arrays could cause visual impacts. Visual resources would be affected within the Project Site for the life of these facilities or their successors. If no longer needed, these lands would be restored to a suitable condition consistent with zoning or adjacent land use. Full recovery of these lands and restoration of any lost habitat or associated wildlife is not assured.

The Proposed Action would increase the availability of electricity generated from renewable energy sources while complying with the DOE EPAct 2005 mandate and the CWA. Implementing the Proposed Action would also contribute towards meeting California's Renewable Portfolio Standards described in Section 1.31, Project Purpose and Need. Overall, the Proposed Action's use of the environment has very little adverse impact on the maintenance and enhancement of long-term productivity, as the development of a solar facility on the Project Site is unlikely to preclude other uses if the facility is decommissioned in the future. Implementation of the no action alternative would require no resource commitments.

4.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

A resource commitment is considered irreversible when direct and indirect impacts from its use limit future use options. Irreversible commitments apply primarily to nonrenewable resources, such as cultural resources, and also to those resources that are renewable only over long periods of time, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for future use. Irretrievable commitment applies to the loss of production, harvest, or natural resources.

The Proposed Action would not result in a large commitment of nonrenewable resources. Land would be disturbed during construction and during the life of the Proposed Project. There would be some loss of existing vegetation, habitats, and wildlife resources. Existing agricultural operations, including dry-farming and cattle grazing, would be excluded from the Project Site for the life of the Project. There may be continued limited grazing by sheep within the Project Site for vegetation control. Land not needed for operation and maintenance of the facilities would be reclaimed immediately after construction. At the end of the useful life of the Proposed Project, developed lands could be reclaimed as well. While every effort would be made to recover native vegetation and habitat, full restoration of preexisting conditions is not assured.

Project construction would require the irretrievable commitment of fossil fuels (diesel and gasoline), oils, and lubricants used by construction equipment and by workers commuting to the site. Construction materials and some equipment that may not be productively recycled would be consumed by the Project. Ongoing operation and maintenance of the facilities would use marginal amounts of fuels, lubricants, and other nonrenewable consumables. Implementation of a Hazardous Materials Storage and Spill Response Plan and a Hazardous Materials Business Plan would help to decrease the likelihood of environmental accidents that would cause irreversible damage.

Cultural resources are by their nature irreplaceable, so altering or eliminating any such resource, be it National Register eligible or not, represents an irreversible and irretrievable commitment. No irretrievable commitment of biological resources would occur, as no species are expected to become extinct, and habitat within much of the Project Site may remain available for wildlife use. Off-site habitat for affected species will be conserved by the Project Proponent, providing protected and potentially enhanced habitat for species even if the Project Site is not used by wildlife. Long-term loss of vegetation would be mitigated to offset Project impacts.

The Proposed Project would increase the availability of electricity generated from renewable sources, which would reduce the effects of global climate change and greenhouse gas emissions. As such, the Project would help to offset the use of nonrenewable resources and contribute to an overall reduction of nonrenewable resources currently used to generate electricity. Best management practices, environmental measures built into the Proposed Action, and mitigation measures would be implemented to ensure that all natural resources are conserved to the maximum extent practicable.

4.4 GROWTH-INDUCING IMPACTS

Section 1508.8(b) of the NEPA implementing regulations requires that an EIS discuss growth-inducing impacts of a project. The discussion must address how a proposed project may remove obstacles to growth, or encourage or facilitate other activities that could significantly impact the environment, either individually or cumulatively. Typically, the growth-inducing potential of a proposed project would be considered significant if it fosters growth or a concentration of population above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Significant growth impacts could also occur if a project adds infrastructure or service capacity which could accommodate growth levels which exceed those permitted by local or regional plans and policies.

The Proposed Project would not result in growth-inducing impacts related to population, housing, or services, or infrastructure. Operation of the Proposed Project would introduce no more than 15 full-time staff. This potential level of population increase could be accommodated by existing housing, services, and infrastructure in the project area.

The Proposed Project has a perceived potential for growth-inducing impacts related to future energy development on the Carrizo Plain. The Carrizo Plain is an area of known high solar resource with existing transmission infrastructure. The presence of two proposed solar facilities in the project area may have the potential to encourage additional proposals for energy development, although any proposed project would be subject to discretionary review and approval by the County of San Luis Obispo, as well as the need to provide additional transmission capacity (the reconductored line would provide transmission capacity only for projects that are currently proposed, as discussed below for the PG&E Reconductoring Project).

Development of additional commercial-scale energy projects on the Carrizo Plain would be subject to County land use regulations and permitting processes. County land use planning regulations guide responsible growth through policies to manage the future growth of the County in compliance with the General Plan; regulate land use in a manner that will encourage and support the orderly development and beneficial use of lands within the County; minimize adverse effects on the public resulting from the inappropriate creation, location, use, or design of building sites, buildings, land uses, parking areas, or other forms of land development by providing appropriate standards for development; protect and enhance the significant natural, historic, archaeological and scenic resources within the county as identified by the General Plan; and assist the public in identifying and understanding regulations affecting the development and use of land (San Luis Obispo County 2010a). Any future energy proposals in the project area would be subject to the County's conditional use permit process and environmental review under CEQA.

County planning documents permit and anticipate a certain level of population and housing growth in the project area, along with attendant growth in energy demand. The production of energy itself would not induce growth in the project area or the larger region, as the additional energy would be used to ease the burdens of meeting existing energy demands within and beyond the area of the Project, and the energy would be used to support already-projected growth in the region. In addition, regulatory goals aim to increase the amount of electricity that is currently provided with renewable energy sources, not increase the overall energy capacity.

The PG&E Reconductoring Project would not result in growth-inducing impacts. The expanded capacity of the Morro Bay to Midway transmission line would accommodate existing load, the Topaz Solar Farm Project, and other generation projects in the region, including the proposed California Valley Solar Ranch Project. The reconductored line would have a capacity very close to the amperage requirements of the line with the inclusion of the proposed projects; thus, the reconductored lines would not have significant excess capacity for additional energy project development.

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REFERENCES

Althouse and Meade. 2010a. Topaz Bio Memorandum 6, Topaz Solar Farm Option A and Option B Jurisdictional Wetlands and Waters Data. Memorandum to Steve McMasters (County of San Luis Obispo) and Jared Varonin (Aspen). August 25, 2010.

_____. 2010b. Final Biological Report for the Topaz Solar Farm. July 2010.

_____. 2010c. Geographic Information Systems shapefiles.

_____. 2010d. Revised Draft Biological Assessment for the Topaz Solar Farm. December 2010.

_____. 2011. Draft Vegetation Management Plan (Includes Weed Management and Grazing Management). Topaz Solar Farm. January 2011.

Althouse and Meade and Huffman-Broadway Group. 2010. Investigation of the Presence of Wetlands and Other Waters of the United States, Topaz Solar Farm Project, California Valley, San Luis Obispo County, California. September 2010.

Arnold, J. 1992. Complex Hunter-Gatherer-Fishers of Prehistoric California: Chiefs, Specialists, and Maritime Adaptations of the Channel Islands. American Antiquity 57:60–84.

Aspen Environmental Group. 2009. Ambient Noise Measurements completed by Lisa Blewitt, Senior Associate, on September 17, 2009.

_____. 2010a. Socioeconomic and Fiscal Impacts of the California Valley Solar Ranch and Topaz Solar Farm Projects on San Luis Obispo County. August 2010. 27pp.

_____. 2010b. Geographic Information Systems shapefiles used in preparation of the Draft Environmental Impact Report.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection on power lines: the state of the art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, DC and Sacramento, CA.

Bartow, J. A. 1991. Geologic Map of the Northwestern Caliente Range, San Luis Obispo County, California. US Geological Survey Miscellaneous Investigations Map I-2077.

Bastian, B., and C. Roland. 2008. Cultural Resources. Preliminary Staff Assessment, Carrizo Energy Solar Farm. Docket 07-AFC-8, California Energy Commission, Siting, Transmission, and Environmental Protection Division, Sacramento.

Beranek, L. L., editor. 1988. Noise and vibration control (revised edition). Institute of Noise Control Engineering, Washington, DC.

Bjurlin, C. D. 2004. Effects of roads on San Joaquin kit foxes: a review and synthesis of existing data. In: Proceedings of the 2003 International Conference on Ecology and Transportation, Eds. Irwin, CL, P Garrett, KP McDermott. Center for Transportation and the Environment, North Caroline State University, Raleigh, NC: pp. 397-406.

Blake, Thomas F. 2000. EQSearch – A Computer Program for the Estimation of Peak Horizontal Acceleration from California Historical Earthquake Catalogs.

Brady, R. 2010. Paleontological Identification Report for the Proposed Topaz Solar Farm, San Luis Obispo, California. Brady and Associates Geological Services, Fresno, California. Prepared for Applied EarthWorks, Inc., San Luis Obispo, California.

Breschini, G. S., T. Haversat, and R. P. Hampson. 1983. A Cultural Resources Overview of the Coast and Coast-Valley Study Areas. Coyote Press, Salinas, California.

Brookhaven National Laboratory. Fthenakis et. al. 2005. Emissions and Encapsulation of Cadmium in CdTe PV Modules During Fires, Progress in Photovoltaics Research and Applications, 13 (8), 713-723.

Bureau of Economic Analysis. 2010. Regional Per Capita Income. Regional Economic Information System, Bureau of Economic Analysis, US Department of Commerce. April 2010. Internet Web Site: http://www.bea.gov/regional/reis/default.cfm?selTable=CA1-3&section=2. Accessed on August 19, 2010.

Bureau of Land Management (BLM). 1984. Manual 8400—Visual Resource Management. Rel. 8-24. April 5, 1984. BLM, Washington, DC.

_____. 1997. Caliente Resource Management Plan. Chapter 11 – Areas of Critical Environmental Concern. Internet Web site: http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/planning/rmpcontents/chapt11_lokern.html. Accessed on January 14, 2011.

_____. 2010a. Carrizo Plain National Monument Approved Resource Management Plan and Record of Decision. April 2010. BLM, Bakersfield, CA.

_____. 2010b. Birds of the Carrizo Plain National Monument. Internet Web Site: http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/carrizo/birds.html. Accessed January 4, 2011.

_____. 2010c. Mammals of the Carrizo Plain National Monument. Internet Web site: http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/carrizo/checklist_mammals.html. Accessed November 2010.

California Air Resources Board (CARB). 2010. iADAM Air Quality Data Statistics. Internet Web site: http://www.arb.ca.gov/adam/select8/sc8start.php. Accessed December 28, 2010.

California Burrowing Owl Consortium. 1993. Burrowing owl survey protocol and mitigation guidelines. April 1993.

California Department of Conservation. 2008. Farmland Mapping and Monitoring Program Map: San Luis Obispo County Important Farmland 2008. Internet Web site: ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2008/slo08.pdf. Accessed January 11, 2011.

_____. 2010. Solar Power and the Williamson Act. May 13, 2010. Internet Web site: http://www.consrv.ca.gov/dlrp/lca/Documents/WA_solar_paper_2010.pdf. Accessed December 8, 2010.

_____. 2011. Farmland of Local Importance. Internet Web site: http://www.consrv.ca.gov/dlrp/fmmp/Documents/Local_definitions_00.pdf. Accessed January 11, 2011.

California Department of Fish and Game (CDFG). 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. November 24, 2009.

_____. 2010. California Natural Diversity Database Rarefind Application. Version 3.1.1, February 28, 2010 data.

California Department of Food and Agriculture. 2010. Pest ratings of noxious weed species and noxious weed seed. January 2010.

California Department of Transportation (Caltrans). 2002. Guide for the Preparation of Traffic Impact Studies. December 2002.

_____. 2003. Transportation Concept Report. Caltrans District 5 Office of System Planning. November 2003.

_____. 2004. Transportation Concept Report. Caltrans District 6 Office of System Planning. December 2004.

_____. 2009a. Traffic and Vehicle Data Systems Unit. All Traffic Volumes on CSHS. Internet Web site: http://traffic-counts.dot.ca.gov/2009all/2009TrafficVolumes.htm. Accessed January 4, 2011.

_____. 2009b. State Route 46 Corridor System Management Plan. San Luis Obispo County. June 2009.

California Department of Water Resources (CDWR). 2004. California's Groundwater Bulletin 118: Carrizo Plain Groundwater Basin. Updated 2/27/04. Internet Web site: http://www.water.ca.gov/. Accessed December 9, 2010.

California Employment Development Department (CAEDD). 2010a. Median Home Prices. Internet Web site: http://www.labormarketinfo.edd.ca.gov/. Accessed on August 13, 2010.

_____. 2010b. Industry Employment and Labor Force. Labor Market Information Division. June 18, 2010.

California Energy Commission (CEC). 2009. Draft Noise and Vibration Section of the Final Staff assessment for the Carrizo Energy Solar Farm Project. June 22, 2009.

_____. 2011. California Energy Commission - Energy Facility Status. Internet Web site: http://www.energy.ca.gov/sitingcases/all_projects.html. Accessed on February 27, 2011.

CAL FIRE. 2010. Comment letter from Paul Lee, Fire Marshal/Battalion Chief on the Draft Environmental Impact Report for the Topaz Solar Farm. November 23, 2010.

California Geological Survey (CGS). 2002. California Geomorphic Provinces. Geological Note 36.

California Invasive Plant Council (Cal-IPC). 2010. Invasive Plant Definitions. Internet Web Site: http://www.cal-ipc.org/ip/definitions/index.php. Accessed January 4, 2011.

California Native Plant Society (CNPS). 2001. CNPS Botanical Survey Guidelines. June 2, 2001.

_____. 2010. CNPS Inventory of Rare and Endangered Plants of California (online edition, v7-10b). California Native Plant Society. Sacramento, CA. Internet Web site: http://www.cnps.org/inventory.

California Public Resources Code. Division 2, Chapter 4, Section 66410. Internet Web site: http://ceres.ca.gov/planning/pzd/sub_ch4.html. Accessed December 9, 2010.

Centers for Disease Control. 2010. "Q & A: Anthrax and Animal Hide Drums." Internet Web site: http://www.bt.cdc.gov/agent/anthrax/faq/pelt.asp. Accessed December 17.

Cleath-Harris Geologists, Inc. 2010. Groundwater Supply Assessment, Topaz Solar Farm. March 26, 2010.

Colten, R. H. 1997. Site Location and Setting. In Hunter-Gatherer Land Use in the San Antonio Creek Drainage: Archaeological Investigations at CA-SBA-2696, vol. I, edited by Barry A. Price, pp. 2.1–2.16. Applied EarthWorks, Inc., Fresno, California. Prepared for the Central Coast Water Authority, Buellton, California.

Council on Environmental Quality (CEQ). 1997. Environmental Justice: Guidance under the National Environmental Policy Act. Washington, DC. December 1997.

Dibblee, T. W. 1973. Regional Geologic Map of San Andreas and Related Faults in Carrizo Plain, Temblor, Caliente, and La Panza Ranges and Vicinity, California. US Geological Survey.

Miscellaneous Geologic Investigations Map I-757. Digital database compiled by S.E. Graham, T.M. Mahony, J. L. Blissenbach, J. J. Mariant, and C. M. Wentworth, 1999.

Dibblee, T. W. and J. A. Minch. 2006a. Geologic map of the California Valley quadrangle, San Luis Obispo County, California: Dibblee Geological Foundation Map DF-203, scale 1:24,000.

_____. 2006b. Geologic map of the La Panza NE quadrangle, San Luis Obispo and Kern Counties, California: Dibblee Geological Foundation Map DF-271, scale 1:24,000.

DOGGR (California Department of Conservation, Division of Oil, Gas and Geothermal Resources). 2010. DOGGR Online mapping service (DOMS). Internet Web site: http://maps.conservation.ca.gov/doms/doms-app.html. Accessed December 16, 2010.

Earth Systems Southwest (ESSW). 2010. Geotechnical Engineering Report for the Topaz Study Areas, Highway 58 at Bitterwater Road, Carrizo Plains, San Luis Obispo County, California. Revised March 15, 2010.

Eichel, M. H. 1971. The Carrizo Plain: A Geographic Study of Settlement, Land Use, and Change. Master's thesis, Department of Geography, San Jose State College.

Environ. 2010. Greenhouse Gases and Climate Change Technical Report. March 15, 2010.

Environmental Data Resources. 2009. The EDR Radius Atlas™ with GeoCheck® for Topaz Solar Farm, Hwy 58/Carissa Hwy, Santa Margarita, CA, 93461. Inquiry Number 2615049.2s November 6.

Erlandson, J. M. 1988. The Role of Shellfish in Prehistoric Economics: A Protein Perspective. American Antiquity 53:102–109.

_____. 1991. Shellfish and Seeds as Optimal Resources: Early Holocene Subsistence on the Santa Barbara Coast. In Hunters and Gatherers of Early Holocene Coastal California, edited by J. M. Erlandson and R. Colten, pp. 89–100. Perspectives in California Archaeology, vol. 1. Institute of Archaeology, University of California, Los Angeles.

_____. 1994. Early Hunter-Gatherers of the California Coast. Plenum, New York.

Faanes, C. A. 1987. Bird behavior and mortality in relation to power lines in prairie habitats. US Fish and Wildlife Service. Fish and Wildlife Technical Report 7. Washington, DC.

Farmer, R. 2007. Draft Archaeological Survey Report for the Carrizo Energy Solar Farm, San Luis Obispo County, California. URS Corporation, Denver, Colorado. Prepared for Ausra, Inc., Palo Alto, California.

First Solar. Undated. Topaz Solar Farm Frequently Asked Questions. Internet Web site: http://www.firstsolar.com/communities/topaz/downloads/faqs.pdf. Accessed December 27, 2010.

_____. 2009. Area Survey. San Luis Obispo County, California. December 2009.

_____. 2010. Topaz Solar Farm Reflection Study. March 2010.

Fitzgerald, R. T. 2000. Cross Creek: An Early Holocene/Millingstone Site. California State Water Project, San Luis Obispo County Archaeological Society Coastal Branch Series Paper No. 12. San Luis Obispo, California.

Flint, S. S., W. M. Nettles, M. Baloian, and B.A. Price. 2000. Archaeological Survey of Selected Portions of the Santa Margarita Ranch, San Luis Obispo County, California. Applied Earthworks, Inc., Fresno California. Prepared for Santa Margarita Ranch LLC, San Luis Obispo, California.

French MEEDDAT (Ministry of Ecology, Energy, and Sustainable Development). July 2009. Summary Report – Environmental, Health and Safety Aspects of First Solar Cadmium – Telleride (Cd-Te) Photovoltaic (PV) Systems.

Fthenakis V. 2002. Could CdTe PV modules pollute the environment? Aug. 2002, Brookhaven National Laboratory, Upton, NY 11973.

_____. 2004. Life cycle impact analysis of cadmium in CdTe PV production. Renewable and Sustainable Energy Reviews. 8 (2004) 303–334.

_____. 2005. Emissions and Encapsulation of Cadmium in CdTe PV Modules During Fires. Progress in Photovoltaics: Research and Applications. 2005. Volume 13, pages 1-11.

Gibson, R. O. 1995. Brief Notices. The Artifact 30:9–10. San Luis Obispo County Archaeological Society.

Glassow, M. A. 1990. Archaeological Investigations on Vandenberg Air Force Base in Connection with the Development of Space Transportation System Facilities, with contributions by Jeanne E. Arnold, G. A. Batchelder, Richard T. Fitzgerald, Brian K. Glenn, D. A. Guthrie, Donald L. Johnson, and Phillip L. Walker. Department of Anthropology, University of California, Santa Barbara. Submitted to U.S. Department of the Interior, National Park Service, Western Region Interagency Archeological Services Branch, San Francisco, Contract No. CX-8099-2-0004.

_____. 1992. The Relative Dietary Importance of Marine Foods through Time in Western Santa Barbara County. In Essays on the Prehistory of Maritime California, edited by Terry L. Jones, pp. 115–128. Center for Archaeological Research Publication No. 10. Davis, California.

_____. 1996. Purisimeño Chumash Prehistory: Maritime Adaptations along the Southern California Coast. Case Studies in Archaeology. Jeffrey Quilter, series editor. Harcourt Brace College Publishers, San Diego.

Glassow, M. A., and L. R. Wilcoxon. 1988. Coastal Adaptations near Point Conception, California, with Particular Regard to Shellfish Exploitation. American Antiquity 53:36–51.

Grant, C. 1965. The Rock Paintings of the Chumash: A Study of California Indian Culture. University of California Press, Berkeley and Los Angeles.

_____. 1978. Interior Chumash. In California, edited by Robert F. Heizer, pp. 530–534. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Greenwood, R. S. 1972. 9000 Years of Prehistory at Diablo Canyon, San Luis Obispo County, California. San Luis Obispo County Archaeological Society Occasional Paper No. 7.

Hackel, S. W. 1998. Land, Labor, and Production. In Contested Eden: California before the Gold Rush, edited by Ramón A. Gutiérrez and Richard J. Orsi, pp. 111–146. Published in association with the California Historical Society, University of California Press, Berkeley.

Hartzell, L. L. 1992. Hunter-Gatherer Adaptive Strategies and Lacustrine Environments in the Buena Vista Lake Basin, Kern County California. Ph.D. dissertation, Department of Anthropology; University of California, Davis.

Haydu, Damon M. 2010. Supplemental Archeological Survey, Topaz Solar Farm Project – 819 Acre Addition. August 13, 2010.

Hedge, Alan. 2011. Acoustic Environment. DEA3500. Cornell University. January 2011.

Henry, T. and J. Maldonado. 2010. Unpublished letter. Center for Conservation and Evolutionary Genetics, National Zoological Park, National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Horvath, G., G. Kriska, P. Malik, and B. Robertson. 2009. Polarized light pollution: a new kind of ecological photopollution. Frontiers in Ecology and the Environment 7 (6): 317-325.

Intergovernmental Panel on Climate Change. 2007. Fourth Assessment Report, Climate Change 2007: Synthesis Report, Summary for Policy Makers. Released in Valencia, Spain. November 17, 2007.

Jefferson, G. T., Fierstine, H. L., Wesling, J. R., and Ku, T. L. 1992. Pleistocene terrestrial vertebrates from near Point San Luis, and other localities in San Luis Obispo County, California: Bulletin of the Southern California Academy of Science, vol. 91, no. 1, p. 26 - 38.

Jones, T. L., S. Anderson, G. M. Brown, A. Garsia, K. Hildebrand, and A. York. 1989 Surface Archaeology at Landels-Hill Big Creek Reserve and the Gamboa Point Properties. University of California, Santa Cruz Environmental Field Program 18.

Jones, T. L., R. T. Fitzgerald, and J. F. Porcasi. 2008. The Cross Creek-Diablo Canyon Complex of South Central California: Mid-latitude Foragers at the Pleistocene-Holocene Boundary. North Pacific Prehistory 2:169–202.

Jones, Terry L., Kathleen Davis, Glen Farris, Steven D. Grantham, Teresa W. Fung, and Betty Rivers. 1994. Towards a Prehistory of Moro Bay: Phase II Archaeological Investigations for the Highway 41 Widening Project, San Luis Obispo County, California. Submitted to the California Department of Transportation, Environmental Branch, San Luis Obispo, California.

Jones, T., N. Stevens, D. Jones, R. Fitzgerald, and M. Hylkema. 2007. The Central Coast: A Midlatitude Milieu. In California Prehistory: Colonization, Culture, and Complexity, edited by Terry Jones and Kathryn Klar. AltaMira Press in cooperation with the Society for California Archaeology, Plymouth, United Kingdom.

Jones, T. L., and G. Waugh. 1995. Central California Coastal Prehistory: A View from Little Pico Creek. Perspectives in California Archaeology, vol. 3. Institute of Archaeology, University of California, Los Angeles.

Kemnitzer, W. J. 1967. Ground water in the Carrizo Plain, San Luis Obispo County, California. Menlo Park, California, February 1, 1967.

Kern County. 1982. Land Use, Open Space, and Conservation Element Plan Map, Kern County, Western Section. April 15, 1982.

_____. 2011. Solar Projects. Internet Web site: http://www.co.kern.ca.us/planning/pdfs/renewable/solar_projects.pdf. Accessed on February 27, 2011.

King, C. D. 1990. Evolution of Chumash Society: A Comparative Study of Artifacts Used for Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804. The Evolution of North American Indians, edited by David Hurst Thomas. Garland, New York.

Latta, Frank. 1977. Handbook of Yokuts Indians. 2nd ed. Bear State Books, Santa Cruz, California.

Lee, P. 2010. Personal communication between Marisa Mitchell of Aspen Environmental Group and Paul Lee, San Luis Obispo County Fire Marshall. September 16, 2010.

Lichtenstein, R., R. Baloian, D. Haydu, and B.A. Price. 2010. Cultural and Paleontological Resources Investigation for the Proposed Topaz Solar Farm, California Valley, San Luis Obispo County. Prepared for First Solar, Inc., Hayward, California.

Maldonado, Jesús E. 2010. Using non-invasive fecal DNA analysis to estimate the presence, distribution and abundance of endangered San Joaquin Kit foxes in the Topaz Solar Farm project study area. Final Report to Althouse and Meade Inc. Friday, July 30, 2010.

Marty, J. T. 2004. Effects of cattle grazing on diversity in ephemeral wetlands. Conservation Biology: 1626-1632.

Monroy, D. 1998. The Creation and Re-creation of California Society. In Contested Eden: California before the Gold Rush, edited by Ramón A. Gutiérrez and Richard J. Orsi, pp.173– 195. Published in association with the California Historical Society, University of California Press, Berkeley.

National Renewable Energy Laboratory. 2010. Cadmium Use in Photovoltaics: The Perceived Risk and the Scientific Evidence. Internet Web site: http://www.nrel.gov/pv/cdte/. Accessed December 16, 2010.

NatureServe Explorer. 2010. "*Euproserpinus euterpe*." Internet Web site: http://www.natureserve.org/explorer. Accessed December 2010.

Natural Resources Conservation Service (NRCS). 2008. Soil survey for San Luis Obispo County, California, Carrizo Plain Area, Soil Survey Geographic (SSURGO) GIS database.

_____. 2010. Web Soil Survey. Internet Web site: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm. Accessed February 18 and December 16, 2010.

_____. 2011. Letter from Ken Oster, Area Resource Soil Scientist, with attached Farmland Conversion Impact Rating form AD-1006. Dated January 5, 2011.

Pacific Gas and Electric (PG&E). 2006. San Joaquin Valley Operations and Maintenance Habitat Conservation Plan.

_____. 2009. Clean Energy Solutions. Internet Web site: http://pge.com/myhome/environment/pge/cleanenergy/. Accessed January 17, 2011.

Penrod, K., W. Spencer, E. Rubin, and C. Paulman. 2010. Habitat Connectivity Planning for Selected Focal Species in the Carrizo Plain. Prepared for the County of San Luis Obispo by SC Wildlands. April 2010.

Price, B. A. 2005. Fashionably Late: Chronological and Cultural Definitions of the Late Period on the Central California Coast. Paper presented at the 39th Annual Meeting of the Society for California Archaeology, Sacramento.

Protogeropoulos. 2002. Photovoltaic Module Laboratory Reflecting Measurements and Comparison Analysis with Other Reflecting Surfaces.

Radle, A. L. 2007. The effect of noise on wildlife: a literature review. Internet Web site: http://interact.uoregon.edu/MediaLit/wfae/library/articles/radle_effect_noise_wildlife.pdf.

San Luis Obispo County. 1979. Transportation Plan of San Luis Obispo County.

_____. 1992. General Plan Noise Element. Adopted May 5, 1992.

_____. 1995. General Plan Energy Element. Adopted April 25, 1995.

_____. 1999. Safety Element, San Luis Obispo County General Plan. Adopted by the County of San Luis Obispo Board of Supervisors, December 14, 1999.

_____. 2001. Water Master Plan. Phase 1 Data Compilation Report. WPA 8 – California Valley. Internet Web site: http://www.slocountywater.org/site/Frequent%20Downloads/Master%20Water%20Plan/Table%20of%20Contents/index.htm. Accessed December 9, 2010.

_____. 2003. Shandon-Carrizo Inland Area Plan. Internet Web site: http://www.slocounty.ca.gov/Assets/PL/Area+Plans/Shandon-Carrizo+Inland+Area+Plan.pdf. Revised January 3, 2003. Accessed December 21, 2010.

_____. 2006. General Plan – Framework for Planning (Inland). Internet Web site: http://www.slocounty.ca.gov/Assets/PL/Elements/inlandframework.pdf. Amended November 2006. Accessed on December 21, 2010.

_____. 2007. General Plan. Adopted by the San Luis Obispo County Board of Supervisors. San Luis Obispo County, California.

_____. 2008. County of San Luis Obispo Land Use Ordinance, Title 22 of the County Code. Adopted by the San Luis Obispo County Board of Supervisors December 18, 1980. Ordinance 2050. Revised December 2008.

_____. 2009a. 2009 Resource Management System Annual Summary Report. 101pp.

_____. 2009b. Initial Study Summary – Environmental Checklist. Department of Planning of Building. 47pp.

_____. 2010a. Topaz Solar Farm Project Draft Environmental Impact Report. October.

_____. 2010b. Shandon-Carrizo-South Planning Area Rural Land Use Category Map. Internet Web site: http://www.sloplanning.org/gis/mapimagepdf/Rural_Shandon-Carrizo_South_LUC_Map.pdf. Accessed December 13, 2010.

_____. 2010c. California Valley Village Reserve Line Land Use Categories. Internet Web site: http://www.sloplanning.org/gis/mapimagepdf/California_Valley_VRL_LUC.pdf. Accessed December 13, 2010.

_____. 2010d. SB 610 Water Supply Assessment; Proposed Topaz Solar Farm Project. San Luis Obispo County, California. October 2010.

_____. 2010e. Final EIR for the California Valley Solar Ranch Project. December 2010.

_____. 2010f. Conservation and Open Space Element of the San Luis Obispo County General Plan.

San Luis Obispo County Air Pollution Control District. 2001. 2001 Clean Air Plan, San Luis Obispo County. December 2001.

San Luis Obispo County Fire Department (SLOCFD). 2010. Internet Web site: http://www.calfireslo.org/. Accessed on August 25, 2010.State of California. 2007. Population Projections for California and Its Counties 2000-2050, by Age, Gender and Race/Ethnicity. State of California, Department of Finance, Sacramento, California, July 2007. Internet Web site: San Luis Obispo County Fire Department 2010. Welcome to Cal Fire/San Luis Obispo County Fire Department. Internet web site: http://www.calfireslo.org/. Accessed December 15, 2010.

Sawyer, J. O., and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society, Sacramento, California. Internet Web site: http://davisherb.ucdavis.edu/cnpsActive Server/index.html.

Sawyer, W. B. undated. Archaeological Reconnaissance for 12 Acres of Section 27, Township 29 South, Range 17 East, San Luis Obispo County, California. Submitted to the Brotherhood of the Tomol, Santa Margarita, California. On file at the Central Coast Information Center, University of California, Santa Barbara.

Serena, J. B. 1983. Cultural Resources Survey of Section 27, TWP. 29S, Range 18E., San Luis Obispo County, California. Submitted to ARCO Solar, Woodland Hills, California. On file at the Central Coast Information Center, University of California, Santa Barbara. Internet Web site: http://www.dof.ca.gov/research/demographic/reports/projections/p-3. Accessed September 7, 2010.

Shuford, W. D., and T. Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

SLOCOG (San Luis Obispo Council of Governments). 2010. The 2010 Regional Transportation Plan for San Luis Obispo County. Internet Web site: http://www.slocog.org/cm/Programs_and_Projects/2010_Regional_Transportation_Plan.html. Accessed December 7, 2010.

Small Area Income Program Estimates (SAIPE). 2008. Estimates for California Counties. Internet Web site: http://www.census.gov/did/www/saipe/data/statecounty/index.html. Accessed August 18, 2010.

Society of Vertebrate Paleontology (SVP) 1995. Assessment and mitigation of adverse impacts to non-renewable paleontological resources – Standard guidelines: Society of Vertebrate Paleontology News Bulletin, no. 163, p. 22-27.

State of California. 2007. Population Projections by Race/Ethnicity, Gender and Age for California and its Counties 2000-2050, Report 06 P-3. Department of Finance, Demographic Research Unit, 2007. Internet web site: http://www.dof.ca.gov/research/demographic/reports/projections/p-3/. Accessed September 7, 2010.

Stewardship Council. 2010. October 2010 Board Meeting Minutes. Internet Web site: http://www.stewardshipcouncil.org/documents/Oct_2010_Board_Minutes_FINAL.pdf. Accessed January 11, 2011.

Supernowicz, D. 1991. Determination of eligibility for Washburn, Selby, and K.C.L. Ranches within the Carrizo Plain, San Luis Obispo County, California. Unpublished report for Bureau of Land Management, Sacramento, California.

Topaz Solar Farms, LLC. 2010. Topaz Truck Management Plan. June 10, 2010.

Truescape. 2010a. Topaz Solar Farm LLC Before and After Booklet. Prepared for First Solar. November 2010.

_____. 2010b. Statement of Authenticity.

UC Extension. 2001. UC Extension (University of California Cooperative Extension, San Luis Obispo County). November 2001. Livestock-Range-Watershed-Oaks Newsletter. Internet Web site: http://cesanluisobispo.ucdavis.edu/newsletterfiles/LIVESTOCK,_RANGE,_&_WATERSHED706.pdf.

URS Corporation. 2007a. Preliminary Geotechnical Investigation, Carrizo Solar Energy Farm, San Luis Obispo County, California. October 1, 2007. Appendix J of the Carrizo Energy, LLC Application for Certification, CESF.

_____. 2007b. Draft Environmental Impact Report, Carrizo Energy Solar Farm, San Luis Obispo County, California. Prepared for Ausra, Inc., Palo Alto, California.

_____. 2008a. Hydrology and Hydrogeology Report for the Vicinity of the Proposed Carrizo Energy Solar Farm. June 27, 2008.

_____. 2008b. Carrizo Energy Solar Farm (07-AFC-8), 2008 Biological Surveys Letter Report, URS Project No. 27658060. October 10, 2008.

_____. 2009. Hydrogeology in the Vicinity of the Proposed California Valley Solar Ranch. December 2009.

US Army Corps of Engineers (USACE). 2008. Regional supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). Washington, DC. September 2008.

_____. 2010. Section 404 Individual Permit Application, Topaz Solar Farm Project, Carrizo Plain, San Luis Obispo, California, Corps File No.: 2009-00150. Prepared by Althouse and Meade for Topaz Solar Farms, LLC.

US Census Bureau. 1990. General Population and Housing Characteristics: 1990. Geographic regions: California, Kern County, San Luis Obispo County, and Census Tract 127.02 (San Luis Obispo County). Internet Web site: http://factfinder.census.gov/home/saff/main.html?_lang=en. Accessed September 10, 2010.

_____. 2000. Census 2000. Geographic regions: California, Kern County, San Luis Obispo County, Census Tracts 33.04 and 45 (Kern County), and Census Tracts 127.02 and 103 (San Luis Obispo County). Internet Web site: http://factfinder.census.gov/home/saff/main.html?_lang=en. Accessed August 11, August 27, and September 1, 2010.

_____. 2009. Population Estimates. Regions: California, Kern County, and San Luis Obispo County. Internet Web site: http://factfinder.census.gov/home/saff/main.html?_lang=en. Accessed August 19, 2010.

_____. 2010. 2005-2009 American Community Survey 5-Year Estimates. Geographic regions: California, Kern County, and San Luis Obispo County. http://factfinder.census.gov/home/saff/main.html?_lang=en. Accessed December 15, 2010.

US Department of Agriculture (USDA). 2007. 2007 Census of Agriculture- County Summary Highlights. National Agricultural Statistics Service. Internet Web site: http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/California/st06_2_001_001.pdf. Accessed December 10, 2010.

US Department of Agriculture, Forest Service. 1995. Landscape Aesthetics: A Handbook for Scenery Management. (Agriculture Handbook Number 701).

US Department of Energy (DOE). 2004. Recommendations for the Preparation of Environmental Assessment and Environmental Impact Statements, Second Edition. December 2004. Internet Web site: http://nepa.energy.gov/documents/green_book2004_12_30_final.pdf. Accessed August 5, 2010.

US Energy Information Administration. 2009. Emissions of Greenhouse Gases Report. Internet Web site: http://www.eia.doe.gov/oiaf/1605/ggrpt/index.html. Accessed May 10, 2010.

US Environmental Protection Agency. 2010a. National Ambient Air Quality Standards. Internet Web site: http://www.epa.gov/air/criteria.html. Accessed on December 27, 2010.

_____. 2010b. Vernal Pools. Internet Web site: http://www.epa.gov/wetlands/types/vernal.html.

_____. 2010c. Environmental Justice Basic Information. Internet Web site: http://www.epa.gov/compliance/environmentaljustice/index.html. Accessed August 5, 2010.

_____. 2010d. Region 9: Water Program, Ground Water, Sole Source Aquifer. Internet Web site: http://www.epa.gov/region9/water/groundwater/ssa.html. Accessed January 10, 2011.

US Federal Highway Administration. 2006. Highway Construction Noise Handbook. Chapter 9. August 2006. Internet Web site: http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm. Accessed July 1, 2010.

USFWS (US Fish and Wildlife Service). 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California. Internet Web site: http://esrp.csustan.edu/publications/pubhtml.php?doc=sjvrp&file=cover.html. Accessed December 9, 2010.

_____. 2001. Fact Sheet: The Endangered Species Act and Candidate Species. September 2001.

USGS (US Geological Survey). 2005. Mineral Resource Data System, California. Internet Web site: http://tin.er.usgs.gov/mrds.

_____. 2010. National Seismic Hazard Mapping, Earthquake Hazards Program, National Seismic Hazard Map website. Internet Web site: http://earthquake.usgs.gov/hazards/products/conterminous/2008/maps. Accessed January 2010.

Valley Fever Center for Excellence. 2010. Internet Web site: http://www.vfce.arizona.edu/. Accessed December 10, 2010.

Wallace, W. J. 1978. Southern Valley Yokuts. In California, edited by Robert F. Heizer, pp. 448–461. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.

Witham, C. W. 2006. Field guide to the vernal pools of Mather Field, Sacramento County. California Native Plant Society, Sacramento Valley Chapter. 48 pp.

Wood Rodgers. 2010. Topaz Solar Farm Transportation Impact Study. July 2010.

Working Group on California Earthquake Probabilities. 2008. Land Use, Open Space, and Conservation Element. General Plan Map. Kern County, Western Section. Internet Web Site: http://www.co.kern.ca.us/planning/pdfs/kcgp/kc_gp_west.pdf. Accessed January 14, 2011.

CHAPTER 8
GLOSSARY

The following glossary of terms was derived from the Draft EIR for the Topaz Solar Farm (San Luis Obispo County 2010a).

100-Year Flood. A stream flow caused by a discharge that is exceeded, on the average, only once in 100 years. A 100-year flood has a one percent chance of occurrence in any given year.

Aggregate. Coarse particulate material such as sand, crushed stone, pebbles, or gravel.

Air Quality Standard. The specified average concentration of an air pollutant in ambient air during a specified time period, at or above which level the public health may be at risk. National ambient air quality standards have been set for the following criteria pollutants: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter (particulate matter with an aerodynamic diameter of 10 microns or less [PM_{10}] and particulate matter with an aerodynamic diameter of 2.5 microns or less [$PM_{2.5}$]).

Ambient Air. Any unconfined portion of the atmosphere; the outside air.

Ambient Noise Level. Noise from all sources, near and far. Ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Baseline. A set of existing conditions against which change is to be described and measured.

Biota. Living organisms.

Cadmium Telluride (CdTe). Cadmium telluride is a stable compound of cadmium (Cd) and tellurium (Te). Cadmium, a human carcinogen produced as a

byproduct of zinc refining, is compounded with tellurium, a byproduct of copper refining, to form the stable compound CdTe.

California Valley. California Valley is an unincorporated community located along Soda Lake Road about two miles south of State Highway 58 in San Luis Obispo County, in the northern portion of the Carrizo Plain. Fewer than 500 people live in California Valley.

California Valley Solar Ranch Project. A project proposed by High Plains Ranch II, LLC, a wholly owned subsidiary of SunPower Corporation Systems (SunPower). The Project is proposed four miles east of the Topaz Solar Farm Project. It would be a 250-MW PV solar power plant. This Project includes an aggregate mine and a 2.8-mile 230-kV transmission line to connect to the existing Morro Bay to Midway 230-kV transmission line.

Carbon Monoxide (CO). A colorless, odorless, toxic gas produced by incomplete combustion of carbon in fossil fuels.

Cultural Resource. Places or objects important for scientific, historical, and religious reasons to cultures, communities, and individuals.

Cumulative Impacts. The impact on the environment that 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

A-weighted Decibel (dBA). The A-weighted decibel scale representing the relative insensitivity of the human ear to low-pitched sounds; decibels are logarithmic units that compare the wide range of sound intensives to which the human ear is sensitive.

Decibel (dB). A logarithmic unit which measures the pressure levels of sounds.

Dry Farmed. Growing crops without irrigation and depending on rain for watering of crops.

Emission. Unwanted substances released by human activity into air or water.

Emission Limit. A regulatory standard that restricts the discharge of an air pollutant into atmosphere.

Environmental Impact Report (EIR). An environmental impact assessment document prepared in accordance with the California Environmental Quality Act (CEQA).

Environment. The physical conditions that exist in the area and that would be affected by a Proposed Project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. The area involved is where significant direct or indirect impacts would occur as a result of the Project. The environment includes both natural and artificial conditions.

Fault. A fracture or zone of fractures in rock strata which have undergone movement that displaces the sides relative to each other, usually in a direction parallel to the fracture. Abrupt movement on faults is a cause of most earthquakes.

Fugitive Dust. Airborne soil particles resulting from direct surface disturbance, such as from construction equipment, or from natural sources, such as wind.

Generation-Tie (gen-tie). Transmission line connecting a generator to the electric grid.

Gigawatt-hour (gWh). A measure of electric energy; one million kilowatt-hours.

Invertebrate. Animals that lack a spinal column.

Inverter. Inverters take the direct current (DC) output of the panels and convert it to alternating current (AC) for delivery to the transmission grid via the project's medium-voltage collection system, substation, and switchyard.

Kilovolt (kV). A measure of electric voltage, one thousand volts.

Key Observation Point (KOP). One or a series of points on a travel route or at a use area where the view of the Proposed Project would be most revealing.

Leq. Energy-equivalent sound level; average level of sound determined over a specific period of time.

Lead Agency. The agency responsible for preparation of the NEPA document. For the proposed Topaz Solar Farm EIS, DOE is the Lead Agency.

Level of Service (LOS). A measure of roadway congestion, ranging from A (free-flowing) to F (highly congested).

Liquefaction. The process of making or becoming liquid (soils).

Megawatt (MW). A measure of electric power equal to 1,000 kilowatts or 1,000,000 watts.

Mitigation. Measures that avoid or substantially reduce the Proposed Project's significant environmental impacts.

Modified Mercalli Intensity (MMI). A subjective numerical index describing the severity of an earthquake in terms of its observed effects on humans, man-made structures, and the earth's surface.

Monitoring Station. A mobile or fixed site equipped to measure instantaneous or average ambient air pollutant concentrations.

Nitrogen Oxides. A gaseous mixture of nitric oxide (NO) and nitrogen dioxide (NO_2) and symbolically represented as NO_3.

NO_2. Nitrogen dioxide. A molecule of one nitrogen and two oxygen atoms. Results usually from further oxidation of nitric oxide (NO) in the atmosphere. Ozone accelerates the conversion.

Ozone. A molecule of three oxygen atoms - O_3. A colorless gas formed by a complex series of chemical and photochemical reaction of reactive organic gases, principally hydrocarbons, with the oxides of nitrogen, which is harmful to the public health, the biota, and some materials.

Option A and B. The Draft EIR prepared by San Luis Obispo County analyzed two project options. Option A (Southern Option) and Option B (Northern Option) included a different configuration of solar arrays with some overlap in land area. Only one option would be permitted if the Project is approved by the County.

Particulate Matter (particulates). Very fine sized solid matter or droplets, typically averaging one micron or smaller in diameter. Also called "aerosol."

Parts per billion (ppb). A measure of the amount of one substance found in a second, which is the carrier.

Parts per million (ppm). Parts per million, a measure of the amount of one substance found in a second, which is the carrier.

Photovoltaic (PV). Direct conversion of light into electricity.

Photovoltaic (PV) Array. An interconnected system of photovoltaic modules that function as a single electricity-producing unit.

Photovoltaic (PV) Module. The smallest assembly of solar cells and ancillary parts, such as interconnections and terminals, intended to generate direct current power under unconcentrated sunlight.

PM_{10} . Particulate matter less than 10 microns in size, which is small enough to be inhaled deeply into the lungs and cause disease.

$PM_{2.5}$. Particulate matter less than 2.5 microns in size, which is small enough to be inhaled.

Prevention of Significant Deterioration (PSD). A federal set of limits on emissions of sulfur oxide and particulates to protect air quality in non-urban area.

Project. The whole of an action that has the potential for resulting in a physical change in the environment, directly or ultimately.

Reconductoring. Installation of new and larger capacity conductors (the wires that carry electricity) on existing transmission towers/poles. Depending on engineering, tower replacement is sometimes necessary to support the larger (i.e., heavier) conductors.

Right-of-way (ROW). An easement, lease, permit, or license across an area or strip of land to allow access or to allow a utility to pass through public or private lands.

Riparian. Area along the banks of a river or lake supporting specialized plant and animal species.

Sensitive Receptor. Land uses adjacent to or within proximity to the Proposed Project that could be impacted by construction, operation, and maintenance activities.

Shrink-Swell Potential. The expansion or contraction of primarily clay-rich soils during alternating wetting and drying cycles.

Skylining. Extending above the horizon line.

Sulfur Oxide (SO_x). The group of compounds formed during combustion or thereafter in the atmosphere of sulfur compounds in the fuel, each having various levels of oxidation, ranging from two oxygen atoms for each sulfur atom to four oxygen atoms.

Substrate. Geologic term describing soil or geologic layers underlying the ground surface.

Sulfates. Compounds in air or water that contain four oxygen atoms for each sulfur atom. See SO_x.

Sulfur dioxide (SO_2). A corrosive and poisonous gas produced from the complete combustion of sulfur in fuels.

Sulfur Oxides. A gaseous mixture of sulfur dioxide (SO_2) and sulfur trioxide (SO_3) and symbolically represented as SOx. Can include particulate species such as sulfate compounds (SO_4).

Terrestrial. Related to or living on land. Terrestrial biology deals with upland areas as opposed to shorelines or coastal habitats.

Visual Sensitivity. Consideration of people's uses of various environments and their concerns for maintenance of scenic quality and open-space values; examples of areas of high visual sensitivity would be areas visible from scenic highways, wilderness areas, parks, and recreational water bodies.

Watershed. The area contained within a drainage divide above a specified point on a stream.

Wetland. Lands transitional between obviously upland and aquatic environments. Wetlands are generally highly productive environments with abundant fish, wildlife, aesthetic, and natural resource values. For this reason, coupled with the alarming rate of their destruction, they are considered valuable resources, and several regulations and laws have been implemented to protect them.

Williamson Act. A state program administered by the County of San Luis Obispo under the California Land Conservation Act of 1965. The program provides an opportunity for landowners to voluntary place their property into a 10-year agricultural preserve in exchange for reduced property taxes. Beginning on the first year following the execution of a 10-year contract, a year is automatically added for each year that elapses to maintain an ongoing 10-year term unless a notice of nonrenewal is served. Once a notice of nonrenewal is served on a contract with 10 years remaining, it takes 9 to 10 years for the contract to expire. Contracts can be cancelled if they meet the findings of the County's Rules of Procedure to Implement the California Land Conservation Act of 1965 (June 1972).

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